

**IN THE UNITED STATES DISTRICT COURT FOR THE
EASTERN DISTRICT OF VIRGINIA
NORFOLK DIVISION**

Latasha Holloway, et al.,

Plaintiffs,

v.

City of Virginia Beach, et al.,

Defendants.

Civil Action No. 2:18-cv-0069

Defendants' Memorandum of Law in Support of Motion for Summary Judgment

EXHIBIT TWO

Expert Rebuttal Report of Anthony E. Fairfax

Expert Report of Anthony E. Fairfax
Response to Peter Morrison's Report

Anthony E. Fairfax
16 Castle Haven Road
Hampton, VA 23666
August 26, 2019

I. Introduction

I have been retained by counsel representing the Plaintiffs in this lawsuit (*Holloway, et al v City of Virginia Beach et al*) to determine whether it is possible to draw an Illustrative Plan with one or more majority Latino (Hispanic), Black, and Asian (“HBA”) combined districts in the City of Virginia Beach, VA. In addition, I was also asked to review past and recent demographics pertaining to the city.

This additional report serves as a response to Dr. Peter A. Morrison’s report (dated August 12, 2019) which evaluated my initial July 15th report expert report.

My qualifications can be found in my prior expert report and I am being compensated at a rate of \$180 per hour.

II. Background

The City of Virginia Beach, VA currently has an eleven-member City Council structure. Three (3) Council members and the Mayor serve "at large" with no district residency requirement. The other seven (7) council members are required to live in the district that they represent. However, all city council members are elected at large and not within the district that they represent.

On July 15, 2019 I submitted an expert report for this case that presented my finding that the minority population in the city of Virginia Beach, Virginia was sufficiently large and geographically compact to constitute two majority Hispanic, Black, and Asian (“HBA”) combined districts. On August 12, 2019, Dr. Peter A. Morrison submitted his evaluation of my initial expert report.

III. Summary of Dr. Morrison’s Findings and Response

The report of Dr. Morrison outlines several disagreements with my initial report. The first is that he claims the Illustrative Plan’s majority minority districts’ Total HBA Citizen Voting Age Populations (“CVAP”) do not constitute a majority. Using an Iterative Proportional Fitting (IPF) technique, he calculates the CVAP of the two districts as 49.9% (District 1) and 49.6% (District 2) versus my calculations of 50.03% for District 1 and 50.04% for District 2. The second disagreement centers around alleged inconsistencies in the census block data reflecting the CVAP values. Finally, his last disagreement with my initial report lies with the use of Hispanic, Black and Asian populations combined. He states that this presumes that political cohesiveness exists between Hispanics, Blacks, and Asians. I address each of Dr. Morrison’s claims below.

Dr. Morrison’s three claims pertaining to my initial report are incorrect, and do not change my conclusions in this case. First, several illustrative plan districts that significantly exceed a majority (50%) of CVAP can be drawn, and the initial Illustrative Plan was shown to further exceed 50% CVAP when the addition of the Black and White combined race category data is included (51.11% and 51.08% for District 1 and 2, respectively).¹ Several alternative plans were found to exceed 50% by almost 6% (55.7%) for District 1 and almost 3% (52.7%) for District 2.

¹ The Black and White race category includes those persons who select both Black (or African American) and White race categories on the census survey form.

A single majority HBA district was also developed that exceeded 50% by more than 8% (58.9%). These alternative plans clearly verify that at least one majority HBA CVAP district can be developed and developed to eliminate any “point” estimate issues.

Dr. Morrison’s claim of inconsistent data is inaccurate and irrelevant. If districts were made up of a few census blocks, Dr. Morrison’s point might carry more weight. However, the Illustrative Plan’s districts and alternative plans’ districts are made up of hundreds of census blocks, which diminishes the census block data variations to virtually nil. The change in final district’s HBA CVAP percentages were found to be extremely small and, in most cases, significant only to the third decimal place.

Finally, Dr. Morrison’s claim that I presume cohesiveness among Hispanic, Black, and Asian voters was simple to address, since considering it is not part of the *Gingles* first prong precondition, and thus is not analyzed in this report. Also, the data indicates that the Hispanic, Black, and Asian populations tend to reside in the same communities. This analysis was shown in my initial expert report, is unrebutted by Dr. Morrison, and is reiterated in this response report.

Despite Dr. Morrison’s claims, the HBA population in Virginia Beach is sufficiently large and geographically compact to constitute a majority in two single-member districts that would likely be able to elect their candidates of choice.

Although Dr. Morrison may prefer the IFP method for disaggregation, the Maptitude method of disaggregation that I used is also a commonly used and reliable technique that produces accurate results. Further, when black and white combined data is considered, Districts 1 and 2 in the Illustrative Plan have even higher CVAP percentages.

In addition to the Illustrative Plan that I included in my initial report, it is possible to draw a number of additional alternative plans with two majority HBA CVAP districts. When analyzing all of the plans using total population, VAP, and CVAP, there are only two instances where the HBA percentage are below 50% (Both of these instances are using 2010 VAP data that were surveyed years ago (the Illustrative Plan and Alternative 4 plan)).

It is also possible to draw plans with at least one HBA majority CVAP district, which is still more than contained in the current City Council plan (which has zero). It is also possible to draw a majority Hispanic and Black CVAP district.

Dr. Morrison’s conclusion about the inconsistent disaggregation of data at the census block level is meritless in practice. The Illustrative Plan’s districts consist of hundreds of census blocks, which diminishes any variation from the disaggregation process, and the differences are minute with no practical impact on my results or conclusions.

IV. Response to Dr. Morrison's Claim Regarding CVAP of Districts 1 and 2 in Illustrative Plan

Dr. Morrison's claim that the Illustrative Plan's Districts 1 and 2 do not have a majority HBA CVAP relies on his use of an alternative disaggregation method, Iterative Proportional Fitting ("IPF"), that he alleges results in CVAP values of 49.99% for District 1 and 49.96% for District 2. He also argues that the majority HBA CVAP percentages of 50.03% (District 1) and 50.04% (District 2) that I report are "point estimates" and "razor-thin."

First, it is important to note that assuming that Dr. Morrison's IPF disaggregation process is correct, it only yields a difference of .04% for District 1 and .08% for District 2.² These amounts on their face are extremely negligible, especially when considering that two different techniques were used. Dr. Morrison's calculated amounts also clearly round to 50%. Further, the Maptitude disaggregation process that I utilized is a commonly used and accepted method in the field, and it provides accurate estimates.³ However, even if Dr. Morrison calculated his estimates correctly and even if his preferred method for disaggregation were accepted, his point is also ultimately irrelevant, because it is possible to produce a number of additional alternative plans with two majority HBA CVAP districts with higher percentages.

In addition, the initial Illustrative Plan's HBA CVAP percentages for District 1 and District 2 are higher when considering the Black and White combined race categories, as presented on page 21 and Appendix D of my initial report, and Table 1 below. District 1 increases to 51.11% while District 2 increases to 51.08% (see Table 1). Given the small differences (.04% and .08%) in the two disaggregation processes, if Dr. Morrison added the Black and White race categories using the IPF techniques, his calculations should yield similar outcomes to the ones that I obtained. Consequently, adding Black and White race categories, Districts 1 and 2 clearly exceed 50% majority-minority HBA CVAP.

Table 1 – Illustrative Plan - HBA & HBA plus B/W using CVAP (2013-17 ACS)			
District	CVAP 13-17ACS	HBA CVAP 13-17ACS	HBA CVAP plus Black/White 13-17ACS
1	29761	14888	15210
2	32804	16415	16755
District	% CVAP 13-17ACS	% HBA CVAP 13-17ACS	% HBA CVAP plus Black/White 13-17ACS
1	29761	50.03%	51.11%
2	32804	50.04%	51.08%

Source: U.S. Census Bureau 2013-2017 5 Year ACS Block Group data, Maptitude for Redistricting Illustrative Plan
Note: 13-17ACS - 2013-2017 5-Year ACS; Black/White included Black and White combined race persons

² Even this amount may be explained due to Dr. Morrison apparently using Total Population as the weighted census block to block group ratio instead of Voting Age Population (VAP) as I used, which is not an apples-to-apples comparison. For the analysis I present here, VAP is the more accurate weighted ratio to use since it is closer to the true citizen voting age population.

³ Further discussion of Maptitude's disaggregation techniques is included in the section of my report below addressing Dr. Morrison's claim regarding alleged inconsistent census block values (see Section V).

Second, as I mentioned above, the Illustrative Plan is not the only possible way to draw two single-member majority HBA CVAP districts for the city of Virginia Beach, VA. As stated in the conclusions of my initial report, the Illustrative Plan is only demonstrative and a number of other configurations that result in two majority HBA CVAP districts can be drawn. I include three additional plans with two majority HBA-CVAP districts below.

For instance, with only minor changes to the districts, an alternative plan (Alternative 1) can be created with an HBA CVAP percentage of 51.50% for District 1 and 51.63% for District 2 (see Table 2 and Figure 1).⁴

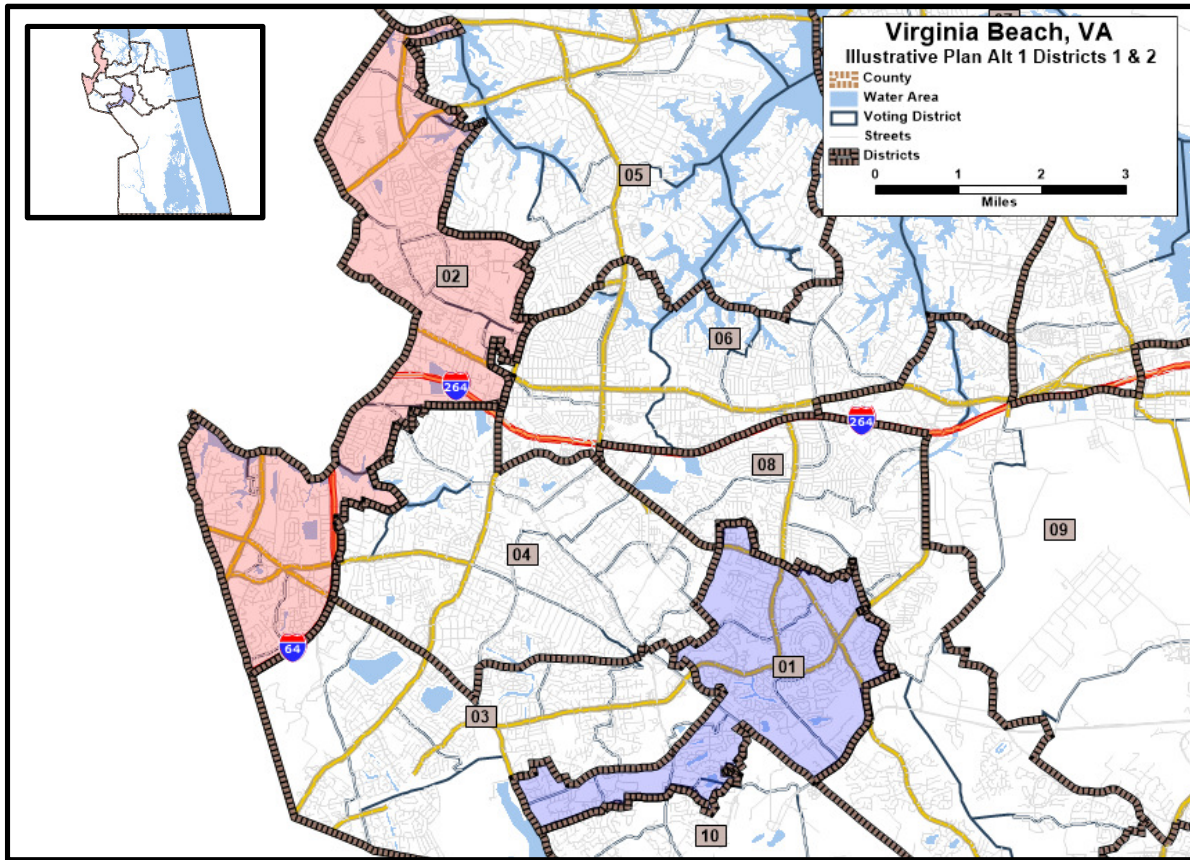
In addition to containing a majority of single race alone HBA CVAP, the HBA CVAP% including persons that identify as *both* Black and White in Districts 1 and 2 in the Alternative 1 plan yields percentages of 52.64% and 52.62% HBACVAP, respectively (see Appendix A).

Table 2 – Illustrative Alternative 1 Plan - Major Race/Ethnicity using CVAP (2013-17 ACS)							
District	CVAP 13-17ACS	Dev	HCVAP 13-17ACS	WCVAP 13-17ACS	BCVAP 13-17ACS	ACVAP 13-17ACS	HBACVAP 13-17ACS
1	28300	-2091	2119	12609	9056	3407	14575
2	32634	-1822	2346	15004	13141	1387	16851
District	% CVAP 13-17ACS	% Dev	% HCVAP 13-17ACS	% WCVAP 13-17ACS	% BCVAP 13-17ACS	% ACVAP 13-17ACS	% HBACVAP 13-17ACS
1	28300	-4.77%	7.49%	44.55%	32.00%	12.04%	51.50%
2	32634	-4.16%	7.19%	45.98%	40.27%	4.25%	51.64%

Note: 13-17ACS - 2013-2017 5-Year ACS

Source: U.S. Census Bureau 2013-2017 5 Year ACS Block Group data, Maptitude for Redistricting Illustrative Plan

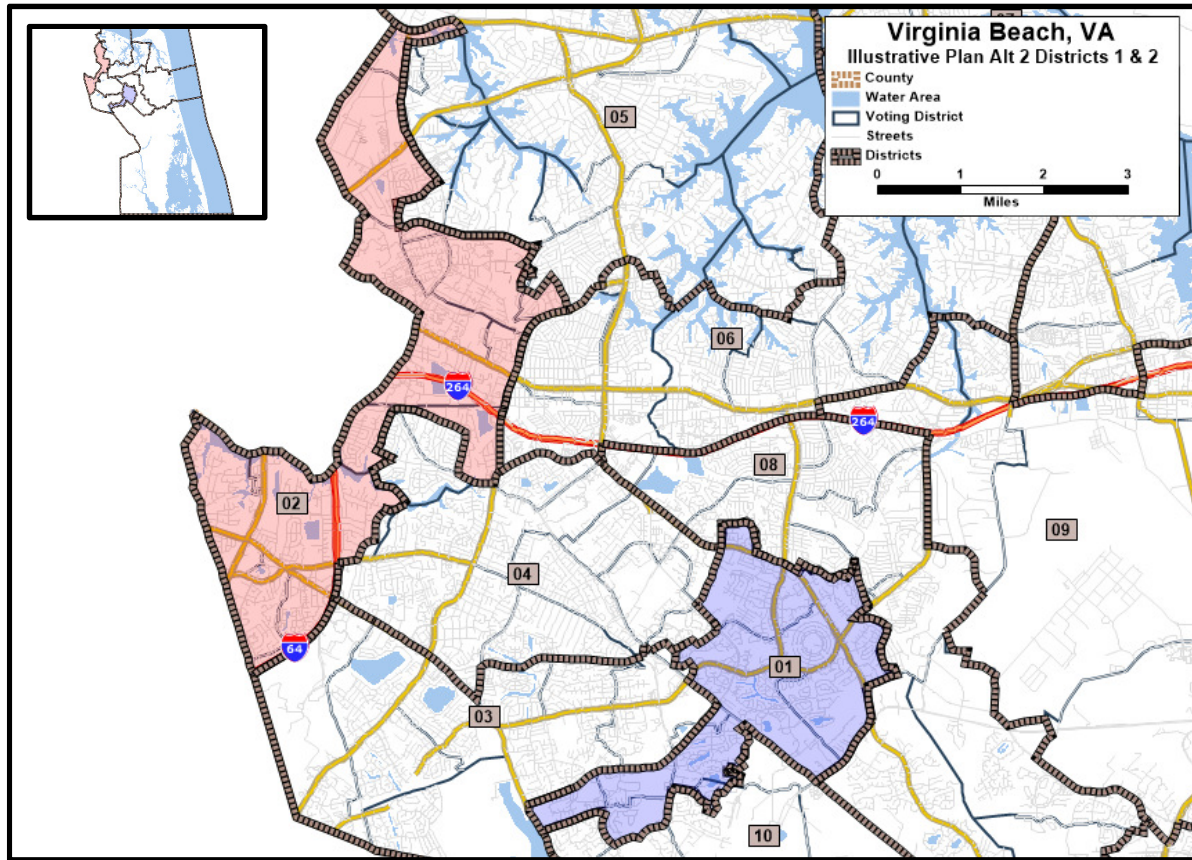
⁴ As with the initial Illustrative Plan, the alternative plan's HBA CVAP totals were summed prior to disaggregation, thus minimizing the potential disaggregation error from three (Hispanic, Black, and Asian CVAP summed together) to one HBA CVAP total. This technique minimizes the disaggregation error associated with the totals, specifically when the total is the focal point (as with a majority minority determination). Thus, the disaggregated totals for Hispanic, Black and Asian combined may not add to the HBA CVAP totals. The Total Pop HBA using the 2013-2017 was calculated by summing the three fields together (See Appendix A).



Source: Illustrative Alternative 1 Plan for Virginia Beach, VA using Maptitude for Redistricting

Figure 1 – Virginia Beach Illustrative Alternative 1 Plan with Two Majority HBA CVAP Districts with slight changes

It is also possible to draw a second alternative plan (Alternative 2) with two single-member majority HBA CVAP districts, using census block groups only (see Figure 2). Alternative 2 has a HBA CVAP of 51.04% for District 1 and 51.07% for District 2, respectively (increased to 52.15% for District 1 and 52.12% District 2 when Black and White combined data is considered). This plan will be discussed further in Section V.



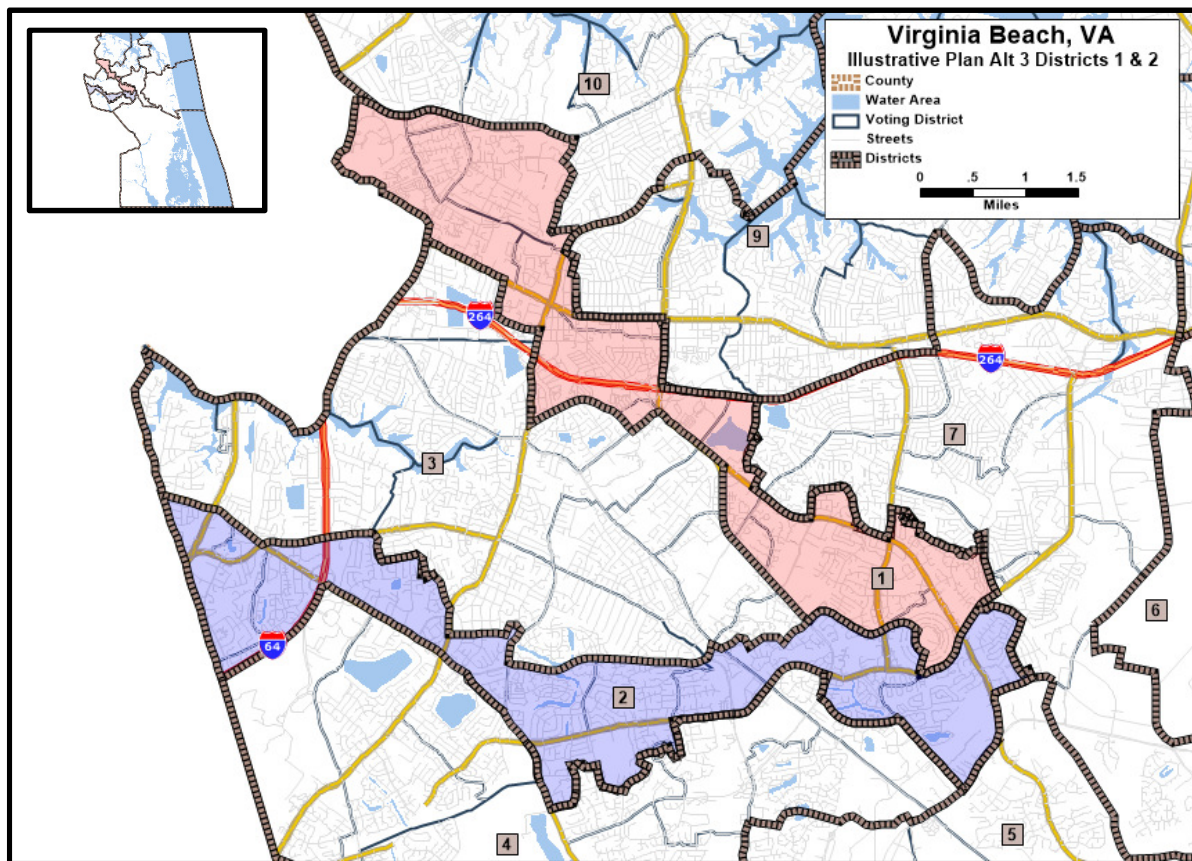
Source: Illustrative Alternative 2 Plan for Virginia Beach, VA using Maptitude for Redistricting

Figure 2 – Virginia Beach Illustrative Alternative 2 Plan with Two Majority HBA CVAP Districts using Block Groups Only

A third alternative plan (Alternative 3) includes two districts with HBA majority CVAP percentages and encompass different geographic locations than the initial Illustrative Plan (see Figure 3). The total HBA CVAP percentages in Alternative 3 are 54.47% for District 1 and 51.92% for District 2. When the Black and White combined data is considered, the percentages increase to 55.72% for District 1 and 52.75% for District 2.

Alternative 3 also reveals that a Majority Hispanic, Black, and Asian combined district using the 2010 Voting Age Population (VAP) data could have been developed. The HBA VAP in 2010 would have been the likely dataset that would have been used if the city of Virginia Beach chose to develop a majority HBA VAP district during the 2010 redistricting cycle.⁵ District 1's VAP in 2010 is 54.05% and District 2 is 51.32% using 2010 VAP census data (see Appendix A).

⁵ The CVAP data that would have also been available during the 2010 redistricting cycle would have been the 2005-2009 5-Year ACS. This dataset would most likely have been too old to use (since its midpoint is 2007) and thus reliance on 2010 VAP would have been more likely.



Source: Illustrative Alternative 3 Plan for Virginia Beach, VA using Maptitude for Redistricting

Figure 3 – Virginia Beach Illustrative Alternative 3 Plan with Two Majority HBA CVAP Districts in different geographic locations

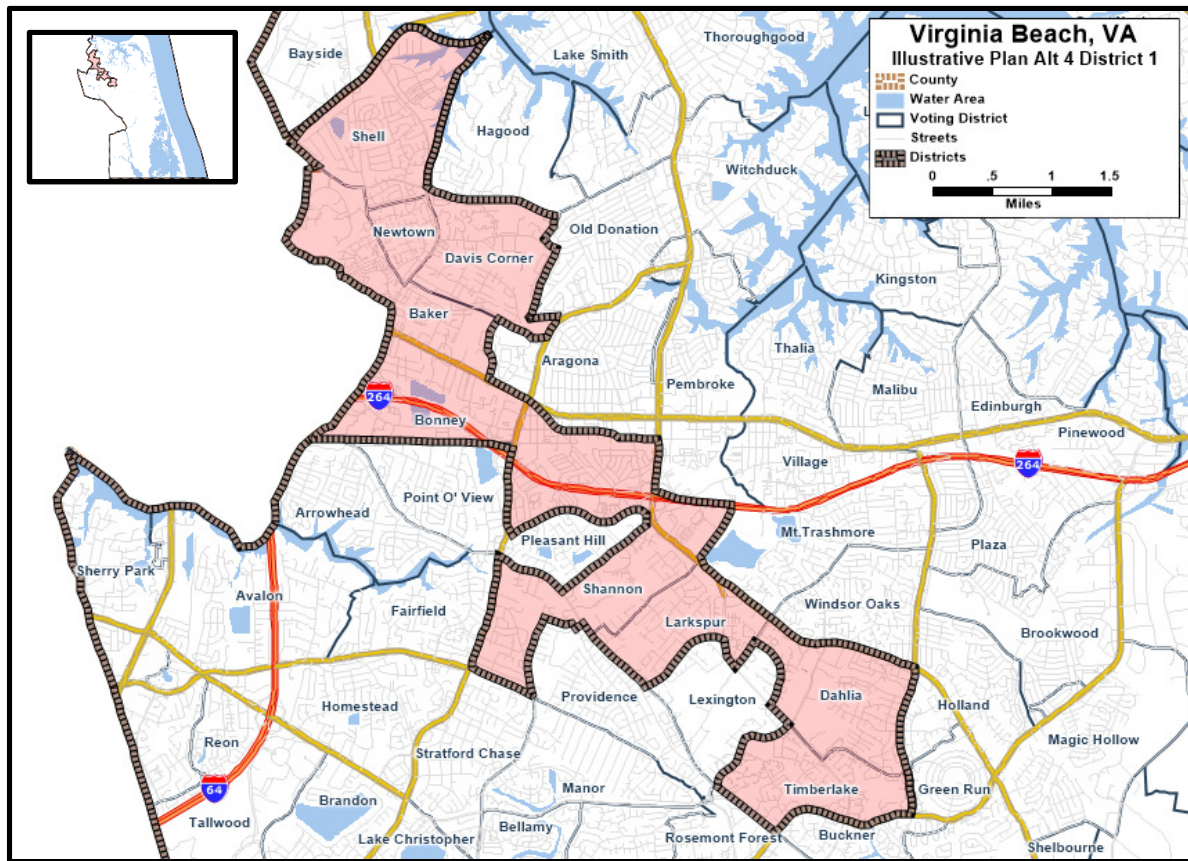
Further, given that it is possible to draw multiple plans with two majority HBA combined CVAP districts, it is also possible to draw a plan that at the very least contains one majority HBA CVAP district. The current City Council plan has zero majority HBA combined CVAP districts (see Appendix D in my initial report). Nothing in Dr. Morrison's report disputes this point. The first *Gingles* precondition reads:

"The minority group must be able to demonstrate that it is sufficiently large and geographically compact to constitute a majority in a single-member district."⁶

⁶ *Thornburg v. Gingles*, 478 U.S. 30 (1986)

Therefore, as long as at least *one* majority HBA combined CVAP district can be drawn, the first *Gingles* precondition would be satisfied. It is possible to draw several plans with one HBA combined CVAP district, and I include an example, Alternative 4, below.

Alternative 4 (Figure 4) includes a single member district with an HBA CVAP percentage of 50.58% (51.46% with the addition of Black and White combined data). This Majority HBA CVAP district did not split any Voting Tabulation Districts (VTDs).⁷

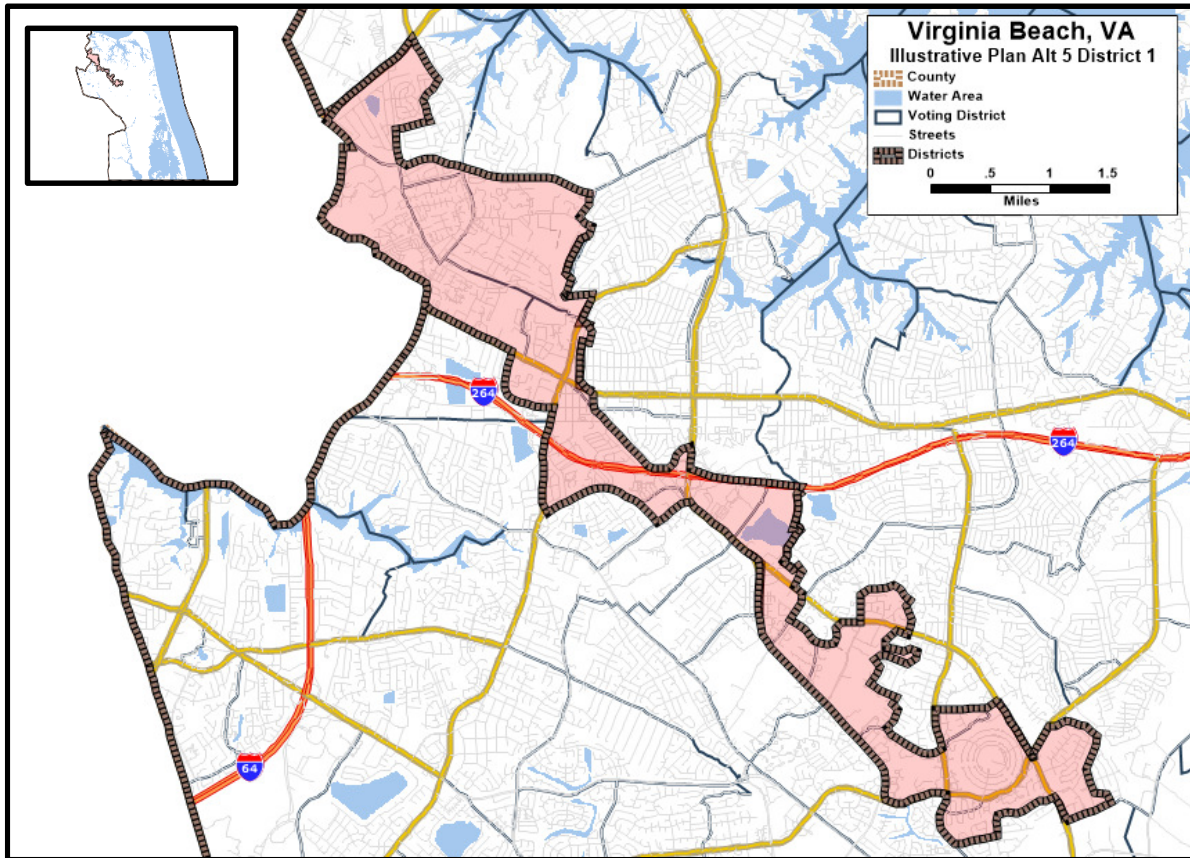


Source: Illustrative Alternative 4 Plan for Virginia Beach, VA using Maptitude for Redistricting

Figure 4 – Virginia Beach Illustrative Alternative 4 Plan with a Majority HBA CVAP District w/No Split VTDs

⁷ Voting Tabulation Districts are generated by the Census Bureau and commonly used synonymously as precincts during the redistricting process. VTDs follow census block boundaries while precincts may not.

In addition, although the focus of the analysis was to draw majority Hispanic, Black and Asian combined districts, another plan alternative was generated that verifies that, at a minimum, a majority Hispanic and Black CVAP district can be drawn (see Figure 5). Alternative 5 shows a majority district with a Hispanic and Black CVAP of 51.04%. When Black and White combined data is considered, the district's CVAP increases to 52.17%.⁸



Source: Illustrative Alternative 5 Plan for Virginia Beach, VA using Maptitude for Redistricting

Figure 5 – Virginia Beach Illustrative Alternative 5 Plan with a Majority Hispanic and Black CVAP District

Finally, the analysis that I performed utilized 2013-2017 5-Year ACS as the most recent data to determine district HBA CVAP percentages. These data as well as the 2010 decennial data provide numbers that occur in the past and not current demographics. Comparing the 2013-2017 5-Year ACS with the 2008-2012 5-Year ACS, the city of Virginia Beach increased 1.55% in its HBA CVAP percentage. The one-year 2017 ACS data for the city shows that there was an additional 1.75% increase in HBA CVAP percentage. Given that the HBA CVAP population in

⁸ Alternative Plan 5 has a HBA CVAP percentage of 57.75% (58.89% with the addition of Black and White race combined data).

Virginia Beach has grown considerably over the past two decades and continues to increase, the Illustrative and alternative plans' current HBA CVAP percentages for the majority-minority districts are ultimately likely to be higher than the values shown in this report's analysis.

V. Response to Dr. Morrison's Claim of Inconsistent Disaggregated Data

Dr. Morrison claims that the disaggregated census block data used to generate the total Hispanic, Black and Asian combined CVAP is "untrustworthy." This claim is meritless. Dr. Morrison points to examples where the block level data shows instances where the CVAP is exceeded by the combined values of Hispanic, Black, and Asian CVAP populations. However, the CVAP may exceed the combined values of Hispanic, Black, and Asian CVAP populations at the census block level and still be trustworthy data at the district and other geographic levels.

If we were interested in analyzing a district the size of a single census block or a small number of census blocks, it is possible that errors in the disaggregation process may be worth considering. However, that is not the case here. Each city council district in the illustrative plans consists of *hundreds* of census blocks, not a handful that would amplify the disaggregation error.

In order to demonstrate why the CVAP data totals occasionally have census blocks that are exceeded by the combined values of Hispanic, Black, and Asian CVAP populations, I will explain the Maptitude for Redistricting ("Maptitude") disaggregation process.⁹

The Maptitude software includes a process that disaggregates a population value of a larger geographic area to a lower sub geographic area.¹⁰ This disaggregation is necessary when drawing a redistricting plan in order to assess the CVAP populations within the district. In this particular case, Maptitude was used to disaggregate CVAP data from the block group level to the census block level. Census blocks are the building blocks of districts.

The following is a simple example to calculate CVAP for a census block. If the VAP of a census block group contains 1,000 people and a census block contained within the block group contains 100 people, Maptitude would use 10% or multiply by .1 to determine the CVAP at the block level. Thus, if 500 persons was the CVAP for the block group, 50 would be the estimated CVAP for the census block.

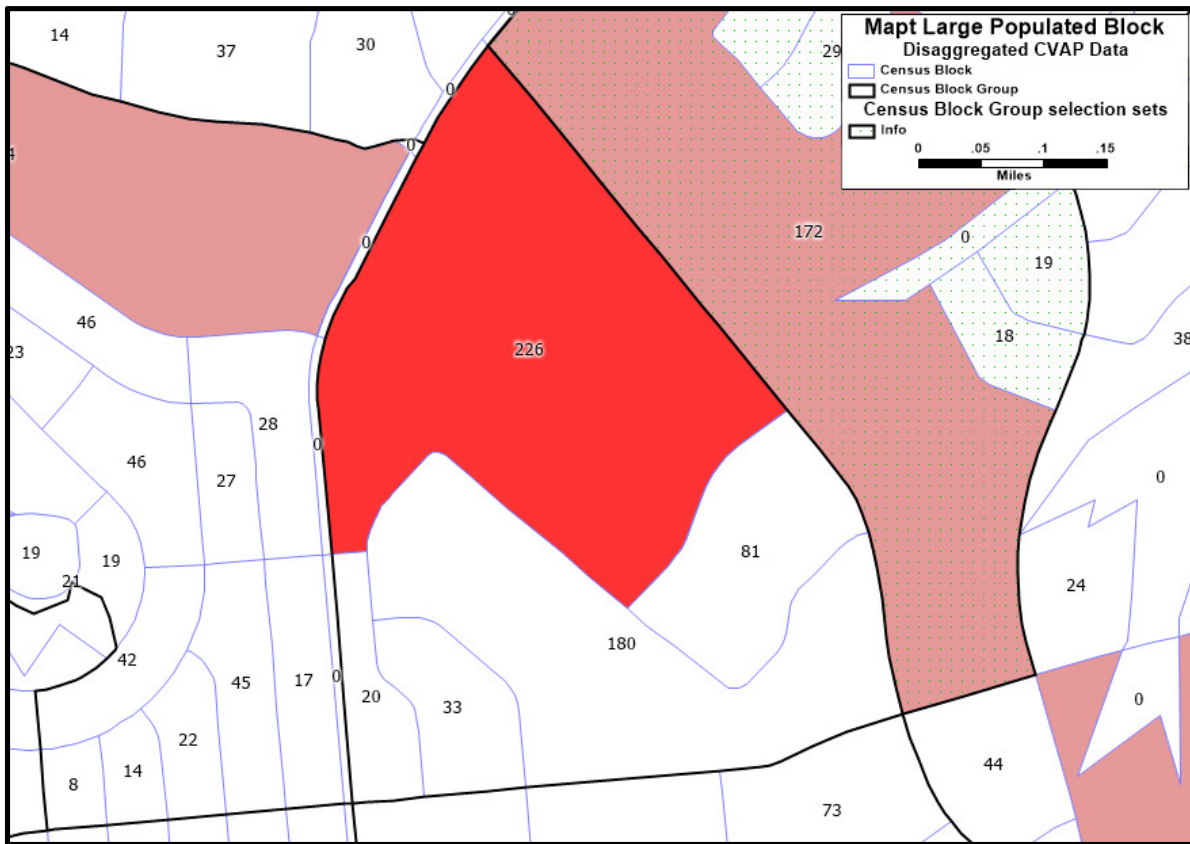
This straightforward example provides the first step in Maptitude's disaggregation process. However, there are many instances when the estimate for the census block equals an integer (a positive whole number) plus a fraction of persons (e.g, 4.5 persons). Because of this occurrence, Maptitude adds a second step. The second step ensures that all blocks contain whole numbers.

⁹ Maptitude is one of the most commonly used software systems by state and local governments, educational institutions, and interest groups for drawing redistricting plans (See Appendix C for partial client list via Caliper website. Source: <https://www.caliper.com/mtrnews/clients.htm>).

¹⁰ Maptitude has two different disaggregation functions. One for wholly contained matching census geography (which was used in this effort) and the other for non-wholly contained and overlapping geographic areas.

The second step¹¹ strips the fractions of persons and assigns them to the largest populated block within the block group. The assignment of these persons eliminates the fractions of persons and increases the population of the largest populated block, but not by a significant amount in most cases.

Figure 6 below shows an actual and typical example of Maptitude's disaggregation process. Figure 6 shows block group 518100422024 in Virginia Beach, VA. It consists of 5 census blocks. The bright red color highlights the largest populated block. The number within each block contains the disaggregated CVAP for each census block.



Source: Maptitude for Redistricting data for Virginia Beach, VA

Figure 6 – Block Group 518100422024 Highlighting Largest Populated Block

¹¹ Regarding this second step, the Maptitude for Redistricting Documentation states: *Each user attribute field is disaggregated to the Census Block level by distributing the count for each higher-level district to its component blocks or block pieces. The portion assigned to each piece is determined using a weighting field (e.g. Population). These values are truncated to integers, any block count below the minimum threshold is changed to zero, and finally any remainder is then assigned to the largest component block in the district. Where two or more districts intersect a block, each will contribute to the block. The result is an attribute field at the block level containing the disaggregated data.* The documentation uses the term “district” in place of the commonly used geographic area such as block group or VTD.

The disaggregation process of Maptitude that determines the CVAP for each block is shown in tabular form in Table 3. The first column is the short label of the block ID. Each row represents a different census block with the largest populated block at the bottom. The second column contains the VAP for each census block while the third column contains the VAP for the block group. The fourth column is the weighted amount that will be used to determine the CVAP at the block level. This is calculated by using the block VAP divided by the block group VAP.

The fifth column shows the CVAP for the block group that will be divided up to each census block. The sixth column (Step 1 DisAggr) contains the calculated CVAP for each census block. It is calculated by multiplying the Weighted % by the block/block group CVAP.

The seventh column displays whole CVAP without the fractional amount for each census block. The eighth column provides the fractional change in each census block population due to stripping away or adding to the largest populated block (1.26012 persons). The ninth column shows the stripped away disaggregated CVAP amount for each block except for the largest populated block that includes the added fractional amount totaling the whole number of 226 (224.73988 plus 1.26012 equals 226).

Table 3 – Block Disaggregation Process for Block Group 518100422021								
BlockID	VAP Block	VAP BG	Weight %	CVAP BG	Step 1 DisAgg1	Stripped	Fraction Change	Step 2 DisAgg2
004	26	692	3.8%	540	20.28902	20	-0.28902	20
003	43	692	6.2%	540	33.55491	33	-0.55491	33
002	104	692	15.0%	540	81.15607	81	-0.15607	81
001	231	692	33.4%	540	180.26012	180	-0.26012	180
000	288	692	41.6%	540	224.73988		1.26012	226
Sum of fractions of persons that are added to largest Pop block (000)							1.26012	

Source: Maptitude for Redistricting census block disaggregated data; U.S. Census Bureau American Community Survey 2013-2017 5-Yr data, 2010 Decennial Population data; Report calculations using Maptitude for Redistricting disaggregation technique.

Measuring the Impact of the Largest Populated Block Disaggregation Technique

The increase in the largest populated block would be worrisome if the city council districts were made up of only a few census blocks. However, the Illustrative Plan's districts are made up of hundreds of census blocks (400 census blocks for District 1 and 633 for District 2 in the initial Illustrative Plan).¹² Thus, aggregating hundreds of census blocks reduces or eliminates any error associated with the assignment of the largest populated block.

¹² Calculated by counting the district's census blocks that are contained within the district plan block assignment or equivalency file.

In order to truly grasp the minute impact of Maptitude's disaggregation technique, I analyzed the entire district to measure the difference. Instead of performing the disaggregation process that was mentioned in Table 3 for a single block group, I perform this analysis on the entire Illustrative Plan.

To perform the analysis, an Excel spreadsheet was setup with all census blocks and the relevant data fields as shown in Table 3. As before, the same calculation of weight%, the first step of disaggregation, the conversion of all census population to integers, and the calculations of the total amount fraction change amount are included.

The key to analyzing the effect of adding the largest populated census block lies with summing all of the fractional population pieces that are contained within each district. If an area contains a split block group containing the largest populated census block it will be slightly higher and if the district contains only the remaining census blocks (where the stripped fraction population occurred), it will be slightly lower. However, because the vast majority of split block groups that contain the largest populated block also contain the census blocks that had their population fractions stripped off, the two offset each other.

The proof of this offset lies with the final change in population when all of the fractions of persons and the largest populated block are added together in a district. Table 4 demonstrates that District 1's CVAP was lowered by a little over five (5) people for the entire district (-5.09305). The HBA CVAP was lowered a little less than five persons (-4.63910). District 2 had even less of an impact, with 0.11179 persons for the CVAP and 0.85174 for the HBA CVAP. Given the minute differences, the impact is thus trivial.

Further evidence of this practically non-existent change is seen when the HBA CVAP% is calculated using the values without using the largest populated block and comparing it to Maptitude's disaggregation values (using the largest populated block technique). Calculating disaggregation without using the largest populated block technique is achieved by dividing the HBACVAP17 DisAggr column by the CVAP17 DisAggr column for each district.

The HBA CVAP% calculation appears to be exactly the same when they are compared using two (2) decimal places. Both processes, calculated to 50.03% for District 1 and 50.04% for District 2. In order to view any difference, at least three (3) decimal places must be taken in consideration.¹³

¹³ Three of the other districts (Districts 3-10), showed a difference of .01%.

Table 4 -Illustrative Plan's Population Impact of Largest Populated Block Technique

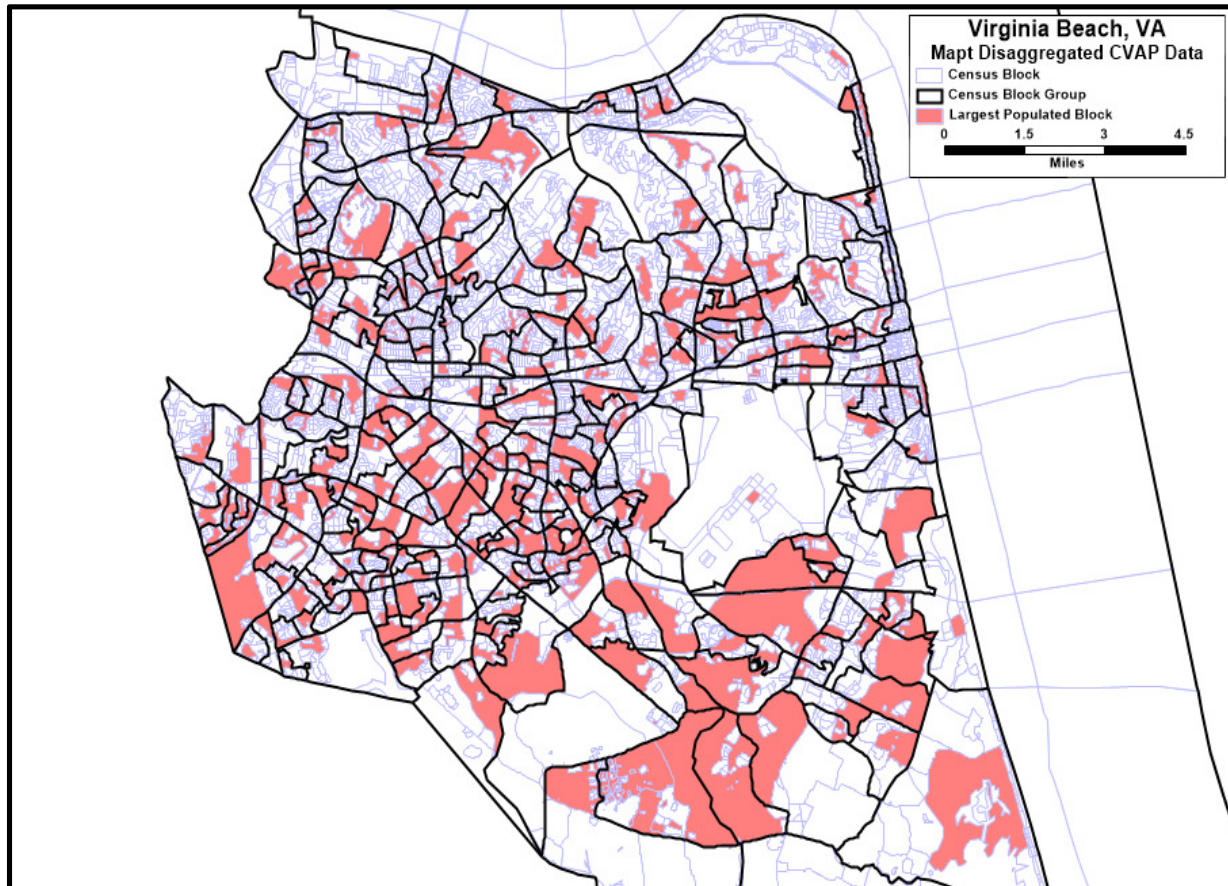
Dist	CVAP17 DisAggr	CVAP17 Strp	CVAP DISAG	CVAP17 Chg	CVAP17		
01	29766.09305	29641	29761	-5.09305	29761		
02	32803.88821	32642	32804	0.11179	32804		
03	31961.85648	31819	31960	-1.85648	31960		
04	33799.93322	33623	33802	2.06678	33802		
05	34688.84486	34407	34689	0.15514	34689		
06	34443.57816	34140	34447	3.42184	34447		
07	35686.66521	35367	35686	-0.66521	35686		
08	33657.33407	33485	33660	2.66593	33660		
09	32840.24399	32637	32843	2.75601	32843		
10	34851.55528	34651	34848	-3.55528	34848		
Dist	HBA CVAP17 DisAggr	HBAC17 Strp	HBA DISAG	HBAC17 Chg	HBA CVAP17	HBA CVAP17% Mapt	HBA CVAP17% Mapt wo/LPB
01	14892.63910	14770	14888	-4.63910	14888	50.03%	50.03%
02	16414.14826	16235	16415	0.85174	16415	50.04%	50.04%
03	13364.47424	13218	13365	0.52576	13365	41.82%	41.81%
04	10612.27770	10435	10612	-0.27770	10612	31.39%	31.40%
05	7131.76589	6861	7133	1.23411	7133	20.56%	20.56%
06	7428.54973	7128	7430	1.45027	7430	21.57%	21.57%
07	5228.71792	4928	5228	-0.71792	5228	14.65%	14.65%
08	9655.04044	9476	9658	2.95956	9658	28.69%	28.69%
09	8862.08495	8665	8863	0.91505	8863	26.99%	26.99%
10	7561.30030	7364	7559	-2.30030	7559	21.69%	21.70%

Source: Maptitude for Redistricting census block disaggregated data; U.S. Census Bureau American Community Survey 2013-2017 5-Yr data, 2010 Decennial Population data; Illustrative Plan Block Assignment List; Results from Microsoft Excel's consolidation function

Note: wo/LDB calculates districts's HBA CVAP% using disaggregation without the Largest Populated Block technique.

In addition, analysis for all of the Alternative Plans reveal that at most the majority HBA CVAP district plans using Maptitude's largest populated block only deviate .03% or less (see Appendix B).

Finally, the random distribution of the largest populated block tends to reduce its impact. This is due to the overpopulation occurring in a random manner as a district splits block groups. Figure 7 below reveals the random nature of the distribution of the largest populated block. There is no geographic pattern associated with its location.



Source: Maptitude for Redistricting Census Block and Block Group Data

Figure 7 – Depiction of the Largest Populated Census Block

Further evidence that the assignment of the largest populated block with the fractional population is not an issue centers on Dr. Morrison's own results. First, Dr. Morrison validates Maptitude's disaggregation process by replicating the process using his own IPF method and returning virtually the same results. His results for the Illustrative Plan were a 49.99% CVAP for District 1 and 49.96% for District 2. My results, using Maptitude's disaggregation process, were 50.03% for District 1 and 50.04% for District 2, respectively. This yields a difference of .04% for District 1 and .08% for District 2. As stated previously in this report, these amounts are extremely negligible, Dr. Morrison's values round to 50%, and he appears to use a different weighting population (total population) than I do (voting age population).¹⁴

In addition, Dr. Morrison's results tend to validate the actual amounts that I originally calculated. In essence, two different disaggregation processes were used, and the results were extremely close to each other. This duplicated processing verifies that the disaggregation amounts determined using the Maptitude method are the actual CVAP values for the Illustrative Plan's Districts 1 and 2.

Given all of these factors, I conclude that overall the Maptitude disaggregation process produces reliable disaggregated CVAP values. As I noted above, Maptitude is a widely used application for redistricting and its disaggregation method is a commonly used and reliable technique in the field (see Appendix C).

VI. Response to Dr. Morrison's Claim Regarding an Alleged Assumption of HBA Political Cohesiveness and Communities

Dr. Morrison states that my use of Hispanic, Black, and Asian population data presumes that political cohesiveness exists between Hispanics, Blacks, and Asians. He states that I "*concocted [an] aggregate of three distinct protected minorities (Hispanics, Blacks, and Asians)*". He also states that: "*This 'tripart minority coalition' district presumes political cohesion among Hispanics, Blacks, and Asians (an embedded assumption without support)*". This argument is nonsensical, for a number of reasons which I outline below.

First, by design, the very purpose of the effort was to focus on whether Hispanic, Black, and Asian CVAP could form a majority in single-member districts. In order to do so, one must consider and aggregate the Hispanic, Black and Asian population data together. It would not make much sense to try to determine whether a majority HBA CVAP district could be drawn by only looking at the black CVAP, for example.

Second, my report provides no opinion on the cohesiveness of minority voters, nor is any proof of the cohesiveness of minority voters necessary to meet the first prong or precondition of *Gingles*.¹⁵ As stated before, the precondition reads:

"The minority group must be able to demonstrate that it is sufficiently large and geographically compact to constitute a majority in a single-member district."

¹⁴ The data provided by Dr. Morrison did not contain label descriptions, but appear to reflect the use of total population and not voting age population.

¹⁵ *Thornburg v. Gingles*, 478 U.S. 30 (1986)

It is my understanding that the political cohesiveness of the HBA population will be addressed by other experts retained by Plaintiffs.

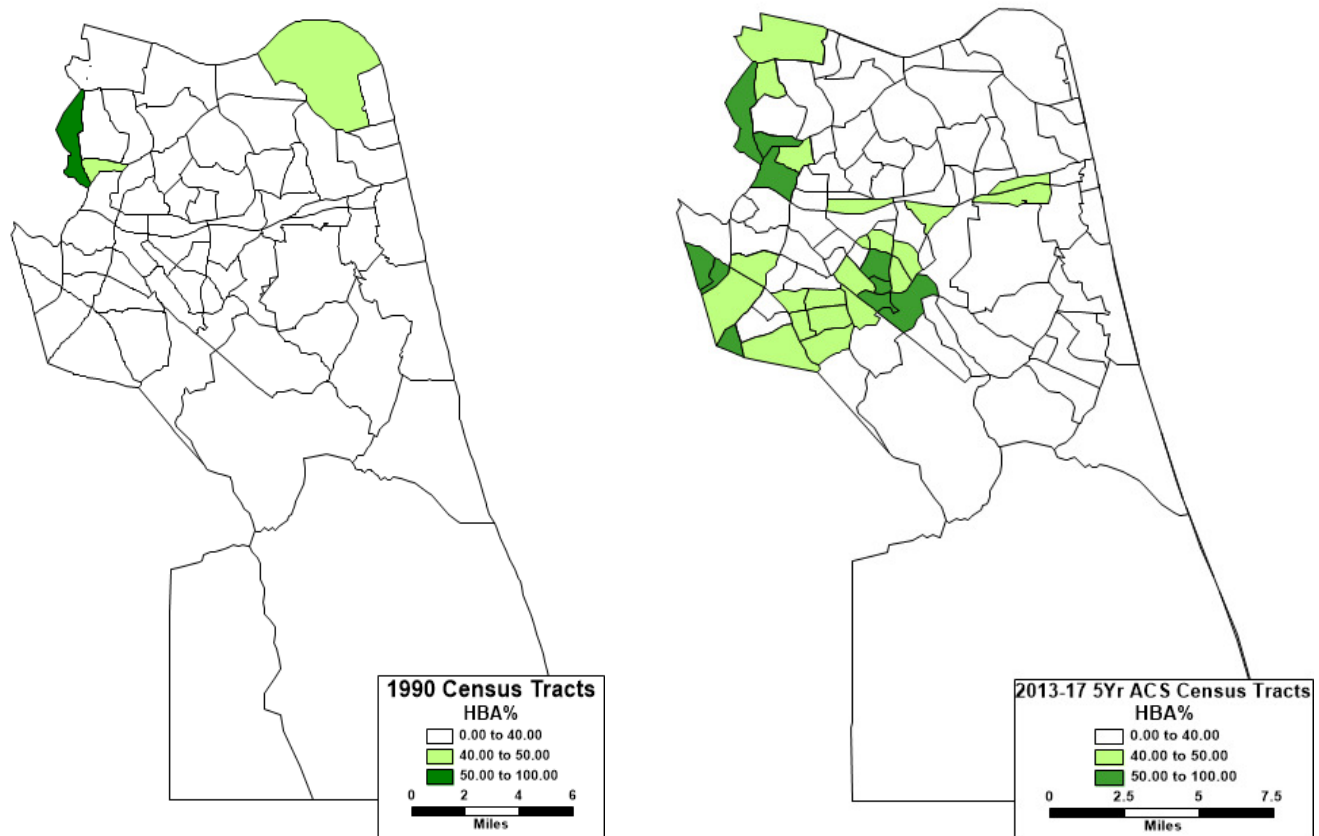
It is also worth stating that Dr. Morrison does not address at all the analysis shown in my initial report that further shows that Hispanics, Blacks, and Asians share common communities and form communities of interest in Virginia Beach. Dr. Morrison's claims seem to suggest that Hispanics, Black, and Asians do not exist in common communities to form a majority minority district. Again, my unrebutted analysis in my initial report shows that is not the case.

Reviewing census tracts from 1990 to recent years shows a growing community of Hispanic, Black and Asians. In 1990, there was only one majority HBA (Total Population) census tract in the city of Virginia Beach.¹⁶ However, according to the 2013 – 2017 5-Year ACS data (2015MP), 10 census tracts now have a combined HBA majority. These 2013-2017 majority HBA communities¹⁷ are located near the western center of Virginia Beach and toward the west and north-west Norfolk & Chesapeake boundary areas of the city (see Figure 8).

A review of the location of these majority HBA census tracts reveals that they are growing only in certain locations of the city. Simply put, HBA persons have chosen to reside in the same areas of the city.

¹⁶ 1990 Decennial Census Survey census tract level

¹⁷ A census tract usually contains one or more neighborhoods within its boundary.



**Figure 8 – Virginia Beach, VA Maj. HBA (Total Race) Census Tracts
(1990 Decennial Census & 2013-2017 5Yr ACS)**

Note: Race categories are Alone (Single Race) Not Hispanic categories

Source: U.S. Census Bureau PL94-171 data for 1990; 2013 - 2017 5-Year ACS data

Additional evidence is shown by reviewing the dot density maps. This provides a different perspective yet yields similar conclusions.

Figures 9, 10, and 11 depict the distribution of Hispanic, Black, and Asian populations throughout the city. Each red dot on the map represents 500 persons residing within the census tract for each respective race/ethnicity. Collectively, the red dots of Hispanic, Black, or Asian population are centered mostly around census tracts that are greater than 40% or 50% HBA.

In fact, reviewing data that sums each race/ethnicity in the census tracts that have greater than 40% HBA verifies that most Hispanic, Black, and Asian persons reside in the same communities. Table 5 shows that 31 of Virginia Beach's 100 census tracts contain 54.90% of the HBA combined population. The same census tracts contain 45.50% of the Hispanic population, 59.02% of the Black population, and 52.20% of the Asian population.

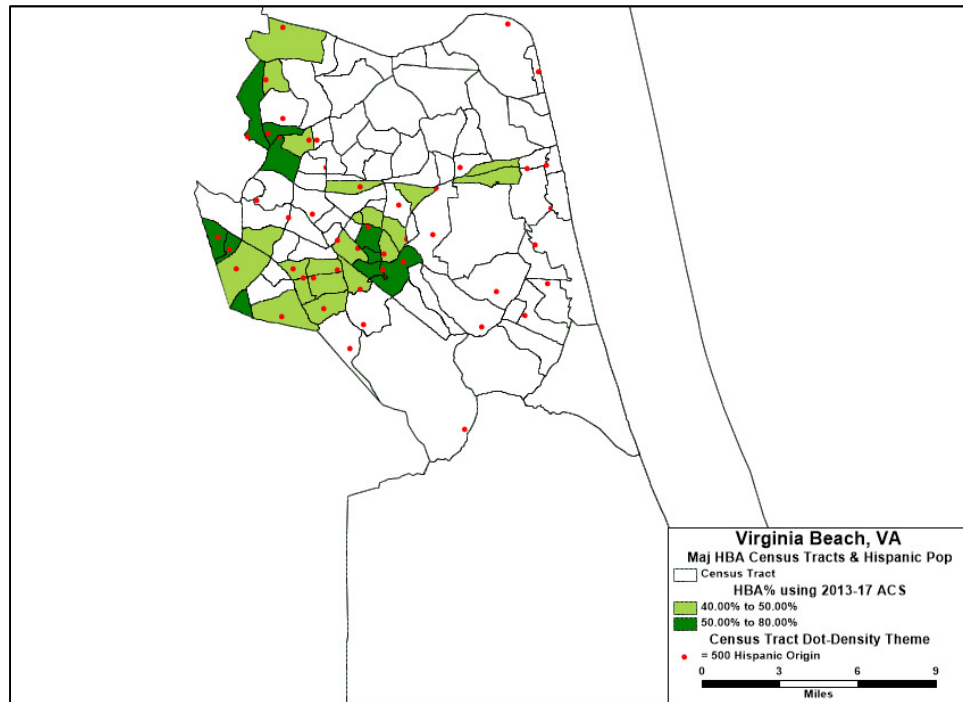


Figure 9 – Virginia Beach, VA Maj. HBA (Total Race) Census Tracts
(with Hispanic Dot Density Points using 2013-2017 5Yr ACS)

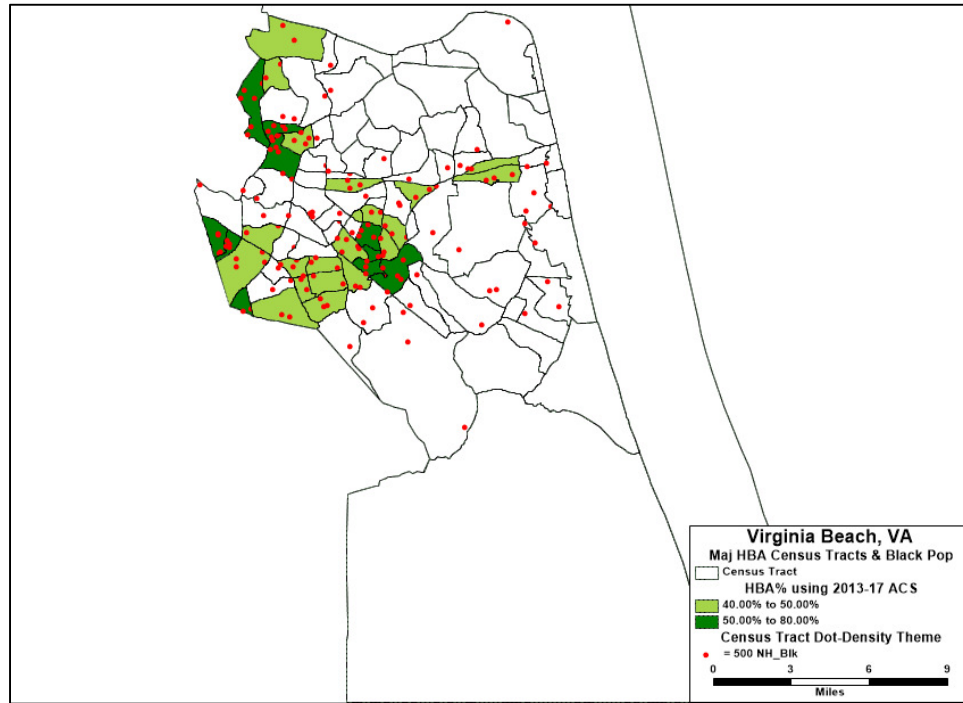
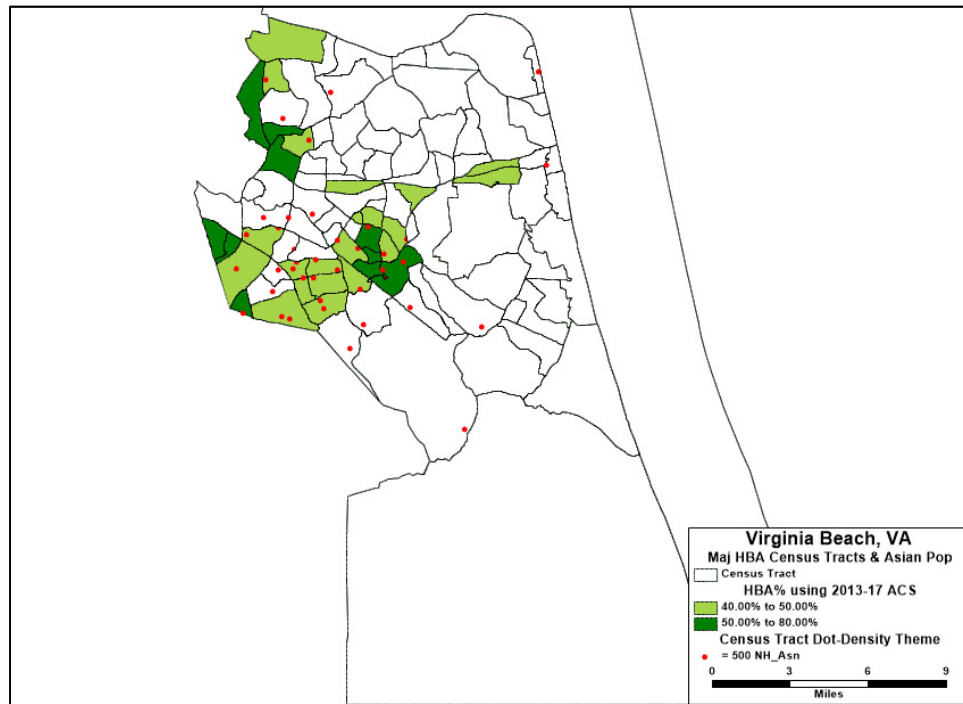


Figure 10 – Virginia Beach, VA Maj. HBA (Total Race) Census Tracts
(with Black Dot Density Points using 2013-2017 5Yr ACS)



**Figure 11 – Virginia Beach, VA Maj. HBA (Total Race) Census Tracts
(with Asian Dot Density Points using 2013-2017 5Yr ACS)**

Table 4 – VAB Population of HBA Residing in >40% and >50% HBA Census Tracts

HBA % CT	# CTs	Hispanic	Black	Asian	HBATTL
>40%	31	13188	49113	13735	76036
>50%	10	4629	22381	4102	31112
City Total	100	28987	83210	26312	138509
HBA % CT	# CTs	Hispanic %	Black %	Asian %	HBATTL %
>40%	31	45.50%	59.02%	52.20%	54.90%
>50%	10	15.97%	26.90%	15.59%	22.46%
City Total	100	100.00%	100.00%	100.00%	100.00%

Note: HBATTL – Total Hispanic, Black, and Asian combined persons (Not Hispanic Black and Asian categories); and CT - Census Tract

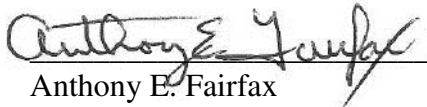
Source: U.S. Census Bureau 2013-2017 5-Year ACS data using Maptitude for Redistricting Dataview Statistical Summary option

Finally, not only do the maps show that the Hispanic, Black, and Asian populations tend to reside in HBA census tracts, close inspection of the maps reveals a similar pattern outside of the majority HBA census tracts. Thus, even where a census tract is not majority HBA, the HBA population tends to reside in those areas.

VII. Conclusions

After addressing all of Dr. Morrison's concerns, I stand by my original conclusion that the minority population in the city of Virginia Beach, VA is sufficiently large and geographically compact to enable the creation of two single-member majority Hispanic, Black and Asian combined districts.

I, Anthony E. Fairfax, am over the age of 18 and fully competent to make this declaration. I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct to the best of my knowledge.

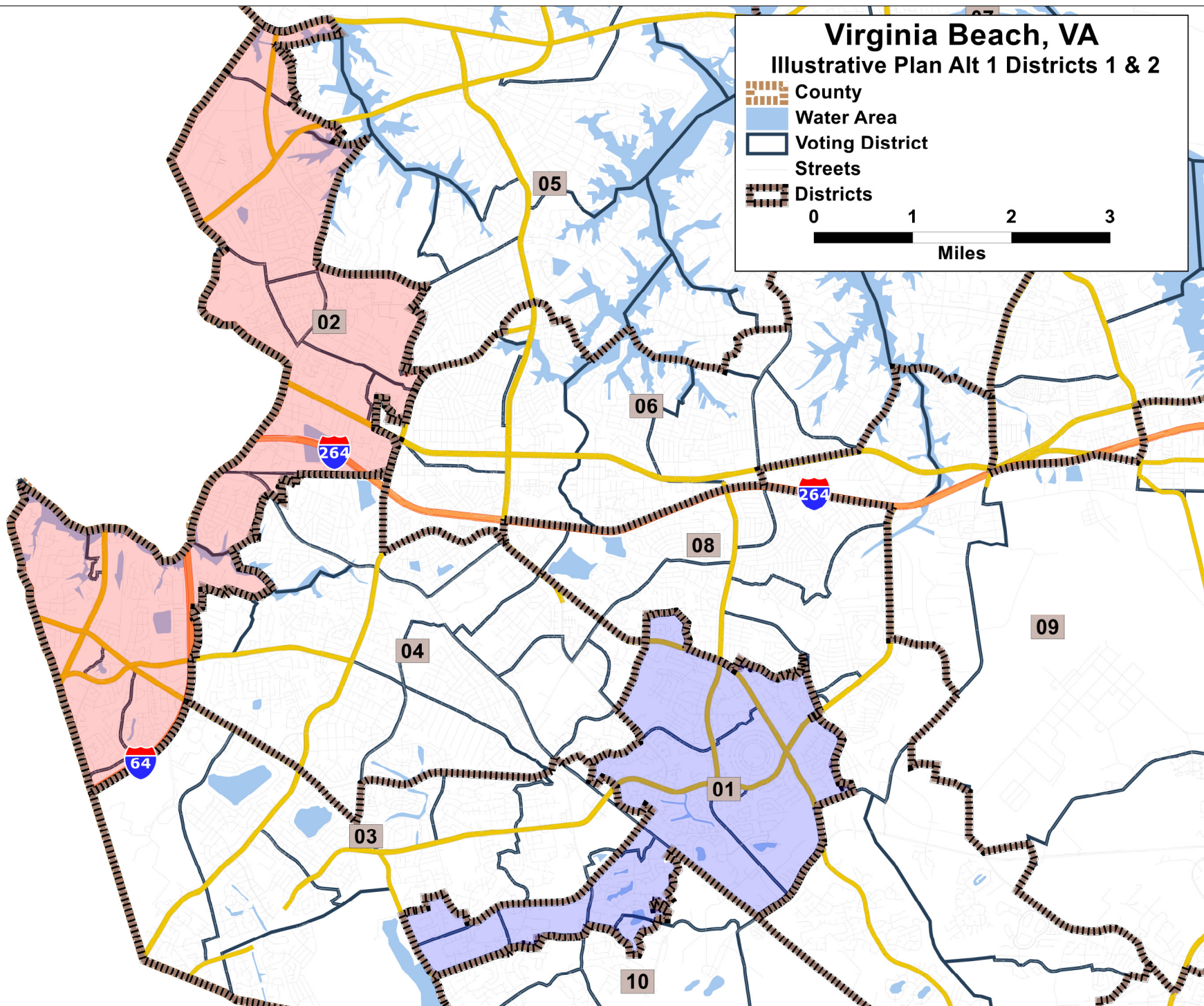
A handwritten signature in black ink, appearing to read "Anthony E. Fairfax", written over a horizontal line.

Anthony E. Fairfax
August 26, 2019

Appendix A

Alternative Plans

Alternative Plans 1 through 5



Virginia Beach, VA

Illustrative Alternative 1 Plan - 10 Districts Statistics

District	Population	Deviation	% Deviation	ispanic Orig	Hispanic Orig	NH_Wh	% NH_Wh	NH_Bl	% NH_Bl	NH_Asn	% NH_Asn	HBATTL	HBATTL%
01	41708	-2091	-4.77%	4047	9.70%	17702	42.44%	12966	31.09%	4924	11.81%	21937	52.60%
02	41977	-1822	-4.16%	3060	7.29%	17939	42.74%	17449	41.57%	1872	4.46%	22381	53.32%
03	43433	-366	-0.84%	2926	6.74%	22810	52.52%	10160	23.39%	5571	12.83%	18657	42.96%
04	45650	1851	4.23%	2559	5.61%	29816	65.31%	8118	17.78%	3343	7.32%	14020	30.71%
05	42745	-1054	-2.41%	2239	5.24%	33115	77.47%	4162	9.74%	1836	4.30%	8237	19.27%
06	43282	-517	-1.18%	2584	5.97%	32170	74.33%	5457	12.61%	1592	3.68%	9633	22.26%
07	44872	1073	2.45%	2499	5.57%	36743	81.88%	3429	7.64%	922	2.05%	6850	15.27%
08	44996	1197	2.73%	3475	7.72%	28877	64.18%	8206	18.24%	2403	5.34%	14084	31.30%
09	44507	708	1.62%	3472	7.80%	30186	67.82%	7645	17.18%	1281	2.88%	12398	27.86%
10	44824	1025	2.34%	2126	4.74%	33112	73.87%	5618	12.53%	2568	5.73%	10312	23.01%

District	18+_Pop	Deviation	% Deviation	H18+_Pop	% H18+_Pop	NH18+_Wh	% NH18+_Wh	NH18+_Bl	% NH18+_Bl	NH18+_Asn	% NH18+_Asn	HBAVAP	HBAVAP%
01	30303	-2091	-4.77%	2602	8.59%	13837	45.66%	9039	29.83%	3834	12.65%	15475	51.07%
02	31775	-1822	-4.16%	2021	6.36%	14958	47.07%	12364	38.91%	1529	4.81%	15914	50.08%
03	32241	-366	-0.84%	1799	5.58%	17630	54.68%	7375	22.87%	4549	14.11%	13723	42.56%
04	34845	1851	4.23%	1657	4.76%	23741	68.13%	5847	16.78%	2690	7.72%	10194	29.26%
05	33983	-1054	-2.41%	1511	4.45%	27109	79.77%	3171	9.33%	1449	4.26%	6131	18.04%
06	33263	-517	-1.18%	1744	5.24%	25442	76.49%	4034	12.13%	1264	3.80%	7042	21.17%
07	36351	1073	2.45%	1699	4.67%	30571	84.10%	2562	7.05%	763	2.10%	5024	13.82%
08	33115	1197	2.73%	2166	6.54%	22018	66.49%	5967	18.02%	1944	5.87%	10077	30.43%
09	33642	708	1.62%	2229	6.63%	24028	71.42%	5394	16.03%	1034	3.07%	8657	25.73%
10	33227	1025	2.34%	1337	4.02%	24854	74.80%	4459	13.42%	1922	5.78%	7718	23.23%

District	Total17	Deviation	% Deviation	Hisp17	% Hisp17	White17	% White17	Black17	% Black17	Asian17	% Asian17	HBA17	HBA17%
01	40143	-2091	-4.77%	3891	9.69%	15747	39.23%	12446	31.00%	5364	13.36%	21701	54.06%
02	44354	-1822	-4.16%	4565	10.29%	17832	40.20%	17854	40.25%	2612	5.89%	25031	56.43%
03	44106	-366	-0.84%	4520	10.25%	22350	50.67%	9160	20.77%	5386	12.21%	19066	43.23%
04	46533	1851	4.23%	3182	6.84%	29096	62.53%	8067	17.34%	4037	8.68%	15286	32.85%
05	44673	-1054	-2.41%	3022	6.76%	33725	75.49%	4432	9.92%	1589	3.56%	9043	20.24%
06	44600	-517	-1.18%	3180	7.13%	31184	69.92%	5498	12.33%	2170	4.87%	10848	24.32%
07	45643	1073	2.45%	2098	4.60%	36139	79.18%	4409	9.66%	1224	2.68%	7731	16.94%
08	47151	1197	2.73%	4440	9.42%	30472	64.63%	7445	15.79%	2703	5.73%	14588	30.94%
09	45704	708	1.62%	4135	9.05%	29869	65.35%	7891	17.27%	1488	3.26%	13514	29.57%
10	47150	1025	2.34%	2222	4.71%	34656	73.50%	5785	12.27%	2482	5.26%	10489	22.25%

District	CVAP17	Deviation	% Deviation	HCVAP17	% HCVAP17	WCVAP17	% WCVAP17	BCVAP17	% BCVAP17	ACVAP17	% ACVAP17	HBACVAP17	% HBACVAP17	HBAWCVP17	% HBAWCVP17
01	28300	-2091	-4.77%	2119	7.49%	12609	44.55%	9056	32.00%	3407	12.04%	14575	51.50%	14898	52.64%
02	32634	-1822	-4.16%	2346	7.19%	15004	45.98%	13141	40.27%	1387	4.25%	16851	51.64%	17171	52.62%
03	31770	-366	-0.84%	2629	8.28%	17380	54.71%	7171	22.57%	3380	10.64%	13179	41.48%	13368	42.08%
04	34584	1851	4.23%	1811	5.24%	22925	66.29%	6175	17.86%	2689	7.78%	10696	30.93%	10814	31.27%
05	34580	-1054	-2.41%	1808	5.23%	27115	78.41%	3540	10.24%	1142	3.30%	6511	18.83%	6623	19.15%
06	33756	-517	-1.18%	1873	5.55%	24990	74.03%	4184	12.39%	1418	4.20%	7460	22.10%	7590	22.48%
07	35686	1073	2.45%	1150	3.22%	29635	83.04%	3279	9.19%	799	2.24%	5228	14.65%	5398	15.13%
08	34775	1197	2.73%	2545	7.32%	23660	68.04%	5408	15.55%	1822	5.24%	9765	28.08%	10185	29.29%
09	33676	708	1.62%	2464	7.32%	23435	69.59%	5628	16.71%	922	2.74%	8998	26.72%	9354	27.78%
10	34739	1025	2.34%	1478	4.25%	25852	74.42%	4546	13.09%	1834	5.28%	7888	22.71%	8092	23.29%

Note: Variables with 17 suffix denote 2013-2017 5-Year ACS; HBAWCVP17 includes Hispanic, Black, and Asian CVAP plus Black and White CVAP mixed persons

Source: Maptitude for Redistricting District Statistics window using U.S. Census Bureau 2010 Census Data and 2013-2017 5-Year ACS Data

User:

Plan Name: VAB Illustrative Plan Final 10 Alt v1

Plan Type:

Contiguity Report

Sunday, August 18, 2019

7:03 PM

District	Number of Distinct Areas
01	1
02	1
03	1
04	1
05	1
06	1
07	1
08	1
09	1
10	1

User:

Plan Name: VAB Illustrative Plan Final 10 Alt v1

Plan Type:

Measures of Compactness Report

Sunday, August 18, 2019

4:34 PM

Sum	N/A	0.00	N/A	N/A
Min	0.20	N/A	0.16	0.54
Max	0.57	N/A	0.56	0.88
Mean	0.38	N/A	0.36	0.75
Std. Dev.	0.12	N/A	0.13	0.13

District	Reock	Perimeter	Polsby-Popper	MinConvexPoly
01	0.31		0.20	0.58
02	0.20		0.16	0.54
03	0.41		0.38	0.76
04	0.57		0.46	0.86
05	0.37		0.40	0.86
06	0.28		0.29	0.70
07	0.53		0.56	0.86
08	0.26		0.23	0.62
09	0.41		0.40	0.81
10	0.50		0.50	0.88

User:

Plan Name: **VAB Illustrative Plan Final 10 Alt v1**

Plan Type:

Political Subdivison Splits Between Districts

Monday, August 26, 2019

1:36 AM

Total number of subdivisions:

County	0
Voting District	72

Number of subdivisions split into more than one district:

County	1
Voting District	22

Number of splits involving no population:

County	0
Voting District	0

Split Counts

County

Cases where an area is split among 10 Districts: 1

Voting District

Cases where an area is split among 2 Districts: 20

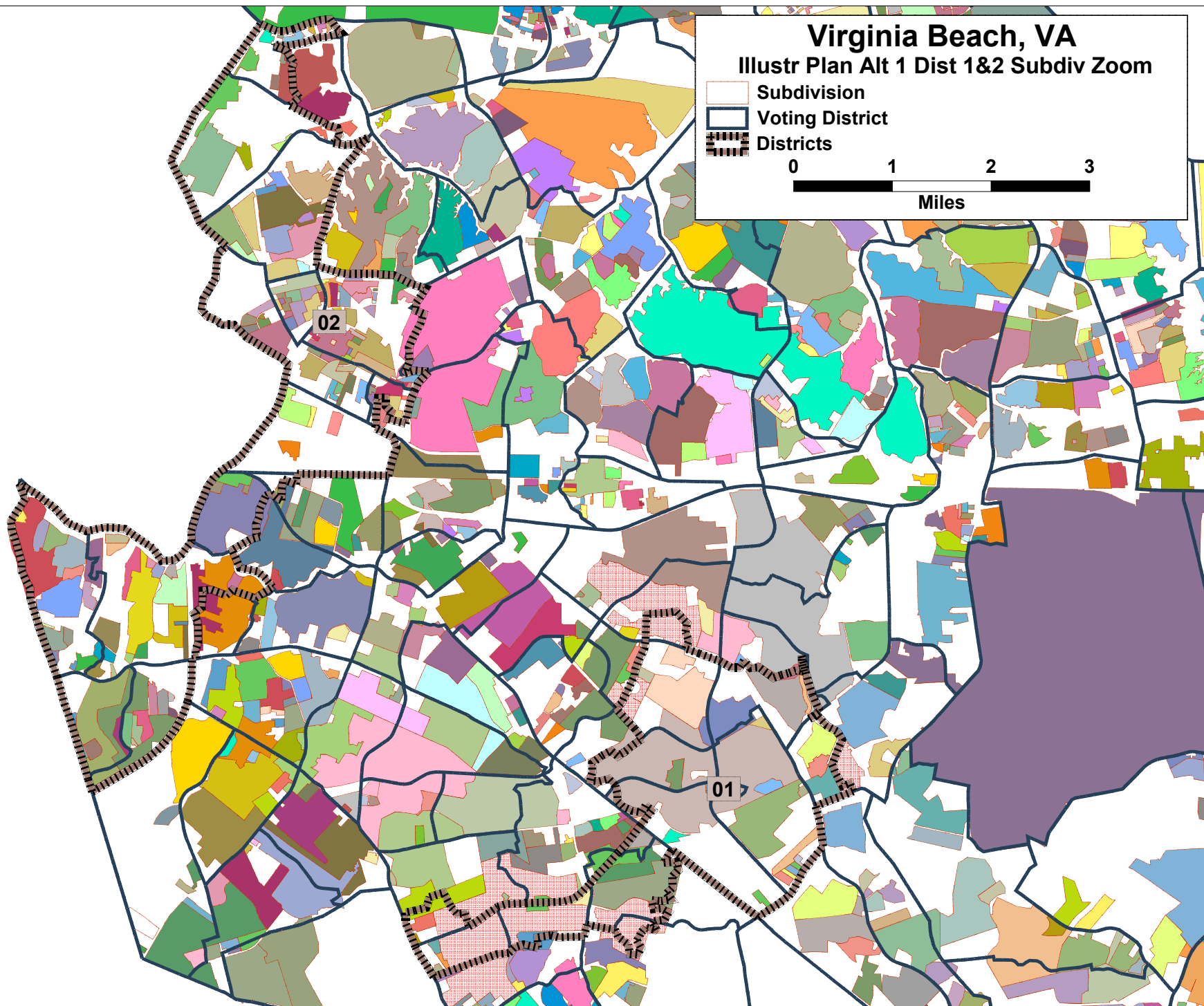
Cases where an area is split among 3 Districts: 2

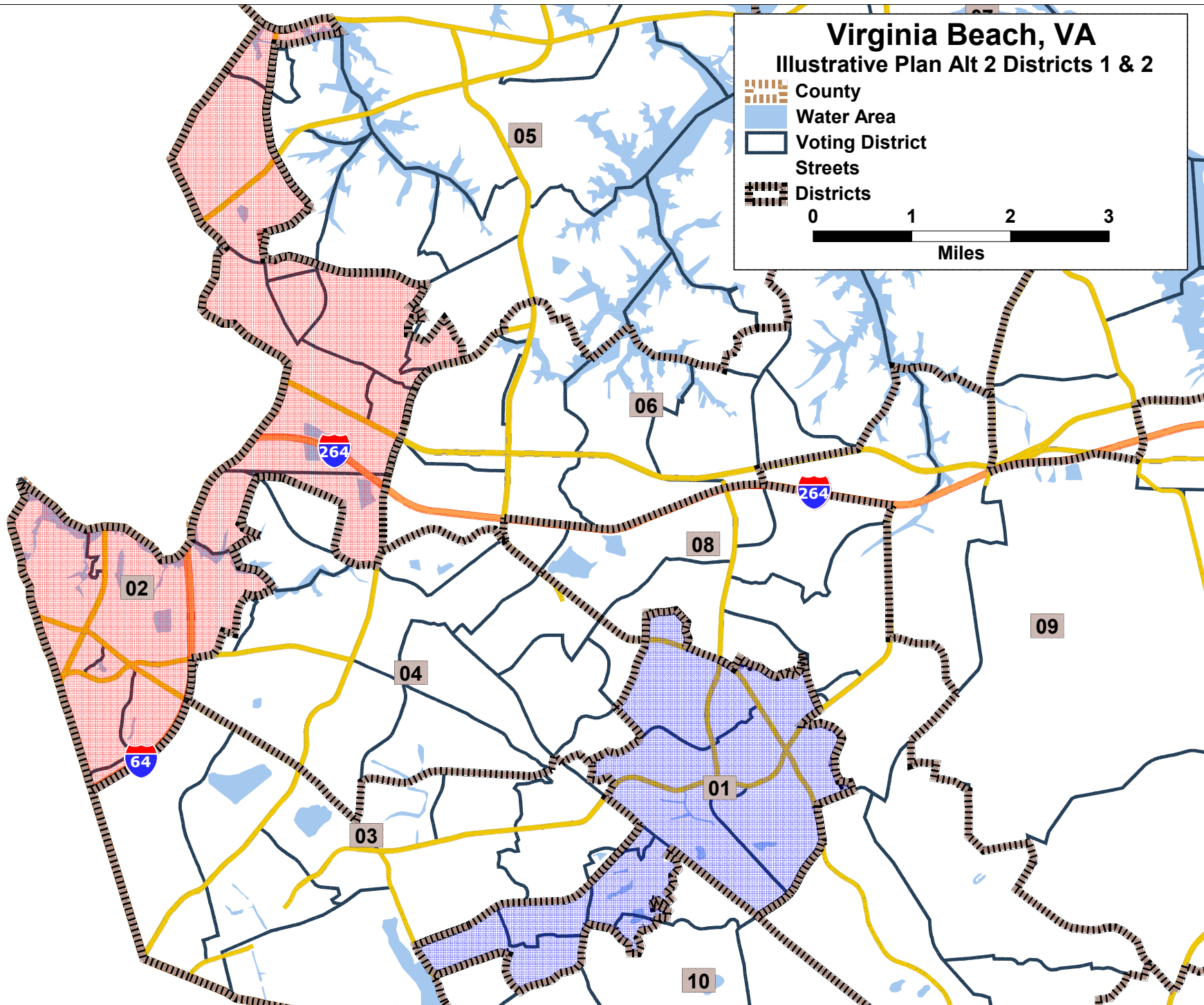
County	Voting District	District	Population
<i>Split Counties:</i>			
Virginia Beach City VA		01	41,708
Virginia Beach City VA		02	41,977
Virginia Beach City VA		03	43,433
Virginia Beach City VA		04	45,650
Virginia Beach City VA		05	42,745
Virginia Beach City VA		06	43,282
Virginia Beach City VA		07	44,872
Virginia Beach City VA		08	44,996
Virginia Beach City VA		09	44,507
Virginia Beach City VA		10	44,824
<i>Split VTDs:</i>			
Virginia Beach City VA	Aragona	02	1,141
Virginia Beach City VA	Aragona	06	6,139
Virginia Beach City VA	Arrowhead	02	2,833
Virginia Beach City VA	Arrowhead	04	1,883
Virginia Beach City VA	Avalon	02	3,729
Virginia Beach City VA	Avalon	04	858
Virginia Beach City VA	Bayside	02	804
Virginia Beach City VA	Bayside	05	1,557
Virginia Beach City VA	Bonney	02	688
Virginia Beach City VA	Bonney	06	2,754
Virginia Beach City VA	Buckner	01	4,515
Virginia Beach City VA	Buckner	03	230

Political Subdivision Splits Between Districts

VAB Illustrative Plan Final 10

County	Voting District	District	Population
Virginia Beach City VA	Cromwell	01	660
Virginia Beach City VA	Cromwell	10	2,561
Virginia Beach City VA	Dahlia	01	6,293
Virginia Beach City VA	Dahlia	04	1,417
Virginia Beach City VA	Glenwood	01	1,203
Virginia Beach City VA	Glenwood	10	3,132
Virginia Beach City VA	Holland	01	4,741
Virginia Beach City VA	Holland	08	3,079
Virginia Beach City VA	Hunt	08	2,022
Virginia Beach City VA	Hunt	10	1,703
Virginia Beach City VA	Kingston	05	1,694
Virginia Beach City VA	Kingston	06	812
Virginia Beach City VA	Magic Hollow	01	3,396
Virginia Beach City VA	Magic Hollow	08	3,913
Virginia Beach City VA	Point O' View	02	180
Virginia Beach City VA	Point O' View	04	3,164
Virginia Beach City VA	Rock Lake	01	4,811
Virginia Beach City VA	Rock Lake	03	315
Virginia Beach City VA	Rock Lake	10	542
Virginia Beach City VA	Rosemont Forest	01	1,770
Virginia Beach City VA	Rosemont Forest	03	3,953
Virginia Beach City VA	Round Hill	01	1,318
Virginia Beach City VA	Round Hill	03	5,890
Virginia Beach City VA	Shannon	04	2,877
Virginia Beach City VA	Shannon	08	451
Virginia Beach City VA	Shelton Park	02	2,322
Virginia Beach City VA	Shelton Park	05	1,672
Virginia Beach City VA	Timberlake	01	4,022
Virginia Beach City VA	Timberlake	03	563
Virginia Beach City VA	Timberlake	04	1,949
Virginia Beach City VA	Upton	09	1,141
Virginia Beach City VA	Upton	10	3,955
Virginia Beach City VA	Windsor Oaks	01	1,197
Virginia Beach City VA	Windsor Oaks	08	5,310





Virginia Beach, VA

Illustrative Alternative 2 Plan - 10 Districts Statistics

District	Population	Deviation	% Deviation	ispanic Orig	Hispanic Orig	NH_Wht	% NH_Wht	NH_Bl	% NH_Bl	NH_Asn	% NH_Asn	HBATTL	HBATTL%
01	41681	-2118	-4.84%	4024	9.65%	17709	42.49%	12968	31.11%	4921	11.81%	21913	52.57%
02	41875	-1924	-4.39%	3013	7.20%	17868	42.67%	17612	42.06%	1725	4.12%	22350	53.37%
03	44521	722	1.65%	3007	6.75%	23324	52.39%	10429	23.42%	5742	12.90%	19178	43.08%
04	44576	777	1.77%	2542	5.70%	28833	64.68%	8091	18.15%	3318	7.44%	13951	31.30%
05	44624	825	1.88%	2370	5.31%	34307	76.88%	4473	10.02%	2025	4.54%	8868	19.87%
06	42579	-1220	-2.79%	2517	5.91%	32032	75.23%	5010	11.77%	1575	3.70%	9102	21.38%
07	44872	1073	2.45%	2499	5.57%	36743	81.88%	3429	7.64%	922	2.05%	6850	15.27%
08	44996	1197	2.73%	3475	7.72%	28877	64.18%	8206	18.24%	2403	5.34%	14084	31.30%
09	44507	708	1.62%	3472	7.80%	30186	67.82%	7645	17.18%	1281	2.88%	12398	27.86%
10	43763	-36	-0.08%	2068	4.73%	32591	74.47%	5347	12.22%	2400	5.48%	9815	22.43%

District	18+_Pop	Deviation	% Deviation	H18+_Pop	% H18+_Pop	NH18+_Wht	% NH18+_Wht	NH18+_Bl	% NH18+_Bl	NH18+_Asn	% NH18+_Asn	HBAVAP	HBAVAP%
01	30278	-2118	-4.84%	2581	8.52%	13847	45.73%	9021	29.79%	3847	12.71%	15449	51.02%
02	31584	-1924	-4.39%	1981	6.27%	14864	47.06%	12444	39.40%	1408	4.46%	15833	50.13%
03	33023	722	1.65%	1851	5.61%	18004	54.52%	7590	22.98%	4668	14.14%	14109	42.72%
04	33982	777	1.77%	1646	4.84%	22935	67.49%	5832	17.16%	2668	7.85%	10146	29.86%
05	35490	825	1.88%	1600	4.51%	28119	79.23%	3385	9.54%	1607	4.53%	6592	18.57%
06	32810	-1220	-2.79%	1706	5.20%	25332	77.21%	3755	11.44%	1249	3.81%	6710	20.45%
07	36351	1073	2.45%	1699	4.67%	30571	84.10%	2562	7.05%	763	2.10%	5024	13.82%
08	33115	1197	2.73%	2166	6.54%	22018	66.49%	5967	18.02%	1944	5.87%	10077	30.43%
09	33642	708	1.62%	2229	6.63%	24028	71.42%	5394	16.03%	1034	3.07%	8657	25.73%
10	32470	-36	-0.08%	1306	4.02%	24470	75.36%	4262	13.13%	1790	5.51%	7358	22.66%

District	Total17	Deviation	% Deviation	Hisp17	% Hisp17	White17	% White17	Black17	% Black17	Asian17	% Asian17	HBA17	HBA17%
01	40060	-2118	-4.84%	3891	9.71%	15972	39.87%	12318	30.75%	5301	13.23%	21510	53.69%
02	44343	-1924	-4.39%	4424	9.98%	18104	40.83%	17848	40.25%	2391	5.39%	24663	55.62%
03	45360	722	1.65%	4596	10.13%	22807	50.28%	9522	20.99%	5581	12.30%	19699	43.43%
04	45462	777	1.77%	3158	6.95%	28234	62.10%	8035	17.67%	3876	8.53%	15069	33.15%
05	46679	825	1.88%	3232	6.92%	34906	74.78%	4622	9.90%	1971	4.22%	9825	21.05%
06	43676	-1220	-2.79%	3135	7.18%	30593	70.05%	5346	12.24%	2170	4.97%	10651	24.39%
07	45643	1073	2.45%	2098	4.60%	36139	79.18%	4409	9.66%	1224	2.68%	7731	16.94%
08	47151	1197	2.73%	4440	9.42%	30472	64.63%	7445	15.79%	2703	5.73%	14588	30.94%
09	45704	708	1.62%	4135	9.05%	29869	65.35%	7891	17.27%	1488	3.26%	13514	29.57%
10	45979	-36	-0.08%	2146	4.67%	33974	73.89%	5551	12.07%	2350	5.11%	10047	21.85%

District	CVAP17	Deviation	% Deviation	HCVAP17	% HCVAP17	WCVAP17	% WCVAP17	BCVAP17	% BCVAP17	ACVAP17	% ACVAP17	HBACVAP17	% HBACVAP17	HBAWCVP17	% HBAWCVP17
01	28225	-2118	-4.84%	2135	7.56%	12750	45.17%	8865	31.41%	3405	12.06%	14405	51.04%	14719	52.15%
02	32395	-1924	-4.39%	2265	6.99%	15025	46.38%	13080	40.38%	1200	3.70%	16545	51.07%	16885	52.12%
03	32616	722	1.65%	2642	8.10%	17751	54.42%	7494	22.98%	3463	10.62%	13595	41.68%	13799	42.31%
04	33849	777	1.77%	1777	5.25%	22287	65.84%	6150	18.17%	2679	7.91%	10611	31.35%	10729	31.70%
05	36137	825	1.88%	1929	5.34%	28144	77.88%	3732	10.33%	1339	3.71%	7016	19.42%	7130	19.73%
06	33173	-1220	-2.79%	1867	5.63%	24578	74.09%	4078	12.29%	1418	4.27%	7346	22.14%	7454	22.47%
07	35686	1073	2.45%	1150	3.22%	29635	83.04%	3279	9.19%	799	2.24%	5228	14.65%	5398	15.13%
08	34775	1197	2.73%	2545	7.32%	23660	68.04%	5408	15.55%	1822	5.24%	9765	28.08%	10185	29.29%
09	33676	708	1.62%	2464	7.32%	23435	69.59%	5628	16.71%	922	2.74%	8998	26.72%	9354	27.78%
10	33968	-36	-0.08%	1449	4.27%	25340	74.60%	4414	12.99%	1753	5.16%	7642	22.50%	7840	23.08%

Note: Variables with 17 suffix denote 2013-2017 5-Year ACS; HBAWCVP17 includes Hispanic, Black, and Asian CVAP plus Black and White CVAP mixed persons

Source: Maptitude for Redistricting District Statistics window using U.S. Census Bureau 2010 Census Data and 2013-2017 5-Year ACS Data

User:

Plan Name: **VAB Illustrative Plan Final 10 Alt v2**

Plan Type:

Contiguity Report

Sunday, August 18, 2019

7:00 PM

District	Number of Distinct Areas
01	1
02	1
03	1
04	1
05	1
06	1
07	1
08	1
09	1
10	1

User:

Plan Name: VAB Illustrative Plan Final 10 Alt v2

Plan Type:

Measures of Compactness Report

Sunday, August 18, 2019

5:09 PM

Sum	N/A	0.00	N/A	N/A
Min	0.20	N/A	0.15	0.49
Max	0.53	N/A	0.56	0.87
Mean	0.38	N/A	0.37	0.75
Std. Dev.	0.11	N/A	0.14	0.13

District	Reock	Perimeter	Polsby-Popper	MinConvexPoly
01	0.32		0.21	0.61
02	0.20		0.15	0.49
03	0.43		0.43	0.77
04	0.51		0.46	0.84
05	0.39		0.41	0.86
06	0.28		0.31	0.72
07	0.53		0.56	0.86
08	0.26		0.23	0.62
09	0.41		0.40	0.81
10	0.50		0.50	0.87

User:

Plan Name: **VAB Illustrative Plan Final 10 Alt v2**

Plan Type:

Political Subdivison Splits Between Districts

Sunday, August 18, 2019

6:52 PM

Total number of subdivisions:

County	0
Voting District	69

Number of subdivisions split into more than one district:

County	1
Voting District	25

Number of splits involving no population:

County	0
Voting District	2

Split Counts

County

Cases where an area is split among 10 Districts: 1

Voting District

Cases where an area is split among 2 Districts: 23

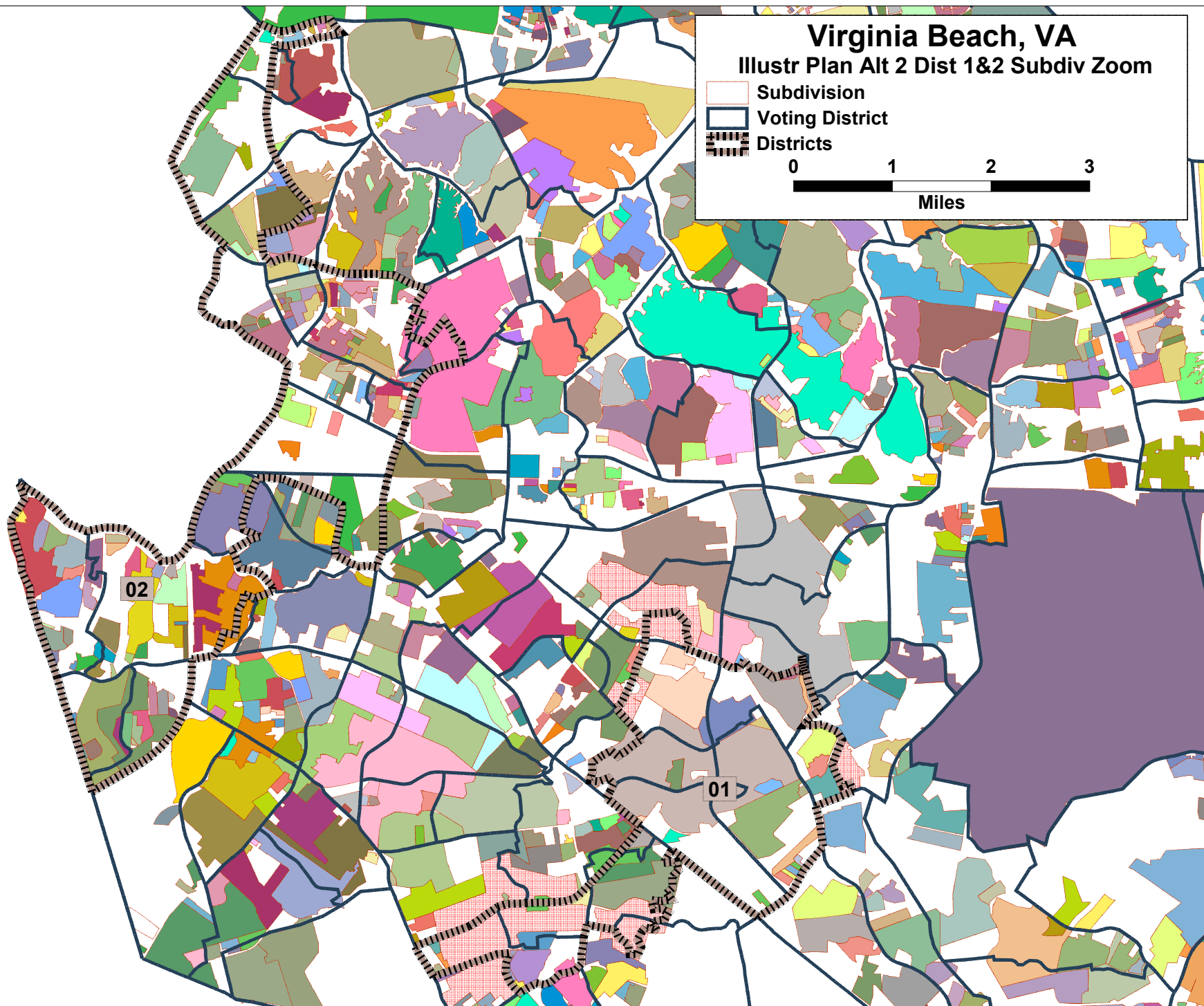
Cases where an area is split among 3 Districts: 2

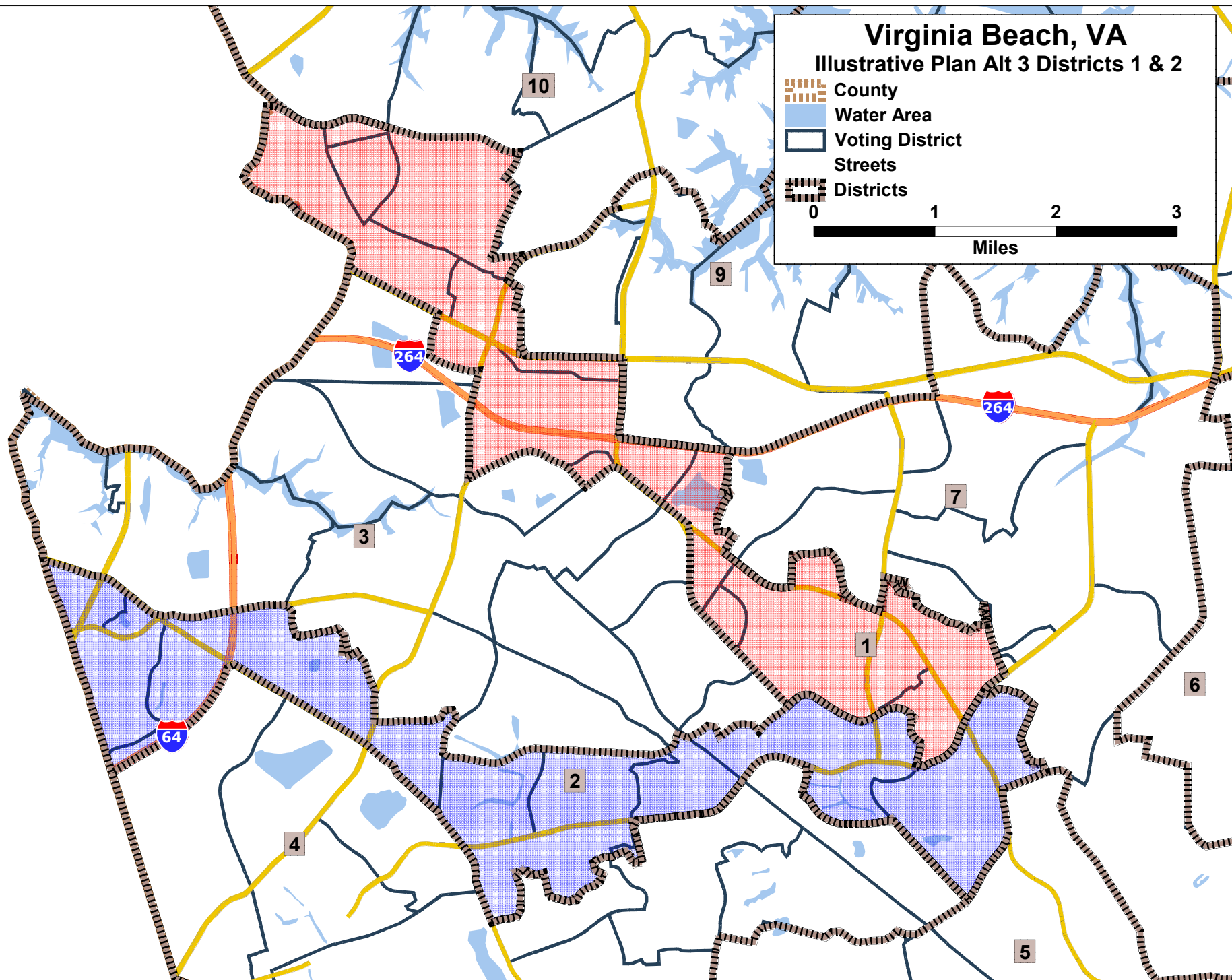
County	Voting District	District	Population
<i>Split Counties:</i>			
Virginia Beach City VA		01	41,681
Virginia Beach City VA		02	41,875
Virginia Beach City VA		03	44,521
Virginia Beach City VA		04	44,576
Virginia Beach City VA		05	44,624
Virginia Beach City VA		06	42,579
Virginia Beach City VA		07	44,872
Virginia Beach City VA		08	44,996
Virginia Beach City VA		09	44,507
Virginia Beach City VA		10	43,763
<i>Split VTDs:</i>			
Virginia Beach City VA	Aragona	02	1,844
Virginia Beach City VA	Aragona	06	5,436
Virginia Beach City VA	Arrowhead	02	2,324
Virginia Beach City VA	Arrowhead	04	2,392
Virginia Beach City VA	Avalon	02	4,441
Virginia Beach City VA	Avalon	04	146
Virginia Beach City VA	Bayside	02	595
Virginia Beach City VA	Bayside	05	1,766
Virginia Beach City VA	Bonney	02	688
Virginia Beach City VA	Bonney	06	2,754
Virginia Beach City VA	Cromwell	01	660
Virginia Beach City VA	Cromwell	10	2,561

Political Subdivison Splits Between Districts

VAB Illustrative Plan Final 10

County	Voting District	District	Population
Virginia Beach City VA	Dahlia	01	6,293
Virginia Beach City VA	Dahlia	04	1,417
Virginia Beach City VA	Davis Corner	02	5,998
Virginia Beach City VA	Davis Corner	05	130
Virginia Beach City VA	Fairfield	02	0
Virginia Beach City VA	Fairfield	04	3,299
Virginia Beach City VA	Glenwood	01	2,264
Virginia Beach City VA	Glenwood	10	2,071
Virginia Beach City VA	Holland	01	4,741
Virginia Beach City VA	Holland	08	3,079
Virginia Beach City VA	Hunt	08	2,022
Virginia Beach City VA	Hunt	10	1,703
Virginia Beach City VA	Kingston	05	1,694
Virginia Beach City VA	Kingston	06	812
Virginia Beach City VA	Magic Hollow	01	3,396
Virginia Beach City VA	Magic Hollow	08	3,913
Virginia Beach City VA	Old Donation	02	576
Virginia Beach City VA	Old Donation	05	5,040
Virginia Beach City VA	Point O' View	02	1,051
Virginia Beach City VA	Point O' View	04	2,293
Virginia Beach City VA	Providence	03	0
Virginia Beach City VA	Providence	04	3,920
Virginia Beach City VA	Rock Lake	01	4,811
Virginia Beach City VA	Rock Lake	03	315
Virginia Beach City VA	Rock Lake	10	542
Virginia Beach City VA	Rosemont Forest	01	1,770
Virginia Beach City VA	Rosemont Forest	03	3,953
Virginia Beach City VA	Shannon	04	2,877
Virginia Beach City VA	Shannon	08	451
Virginia Beach City VA	Shell	02	3,256
Virginia Beach City VA	Shell	05	1,260
Virginia Beach City VA	Shelton Park	02	1,466
Virginia Beach City VA	Shelton Park	05	2,528
Virginia Beach City VA	Timberlake	01	4,022
Virginia Beach City VA	Timberlake	03	563
Virginia Beach City VA	Timberlake	04	1,949
Virginia Beach City VA	Upton	09	1,141
Virginia Beach City VA	Upton	10	3,955
Virginia Beach City VA	Windsor Oaks	01	1,197
Virginia Beach City VA	Windsor Oaks	08	5,310





Virginia Beach, VA

Illustrative Alternative 3 Plan - 10 Districts Statistics

District	Population	Deviation	% Deviation	ispanic Orig	Hispanic Orig	NH_Wht	% NH_Wht	NH_Bl	% NH_Bl	NH_Asn	% NH_Asn	HBATT	HBATT%
01	41660	-2139	-4.88%	3776	9.06%	15978	38.35%	17577	42.19%	2410	5.78%	23763	57.04%
02	45279	1480	3.38%	3779	8.35%	19066	42.11%	15238	33.65%	4995	11.03%	24012	53.03%
03	45890	2091	4.77%	2328	5.07%	31805	69.31%	7224	15.74%	2829	6.16%	12381	26.98%
04	41890	-1909	-4.36%	2757	6.58%	22334	53.32%	9193	21.95%	5736	13.69%	17686	42.22%
05	45184	1385	3.16%	2164	4.79%	34026	75.31%	5105	11.30%	2458	5.44%	9727	21.53%
06	45041	1242	2.84%	3412	7.58%	31739	70.47%	6732	14.95%	1345	2.99%	11489	25.51%
07	42833	-966	-2.21%	3225	7.53%	28181	65.79%	7651	17.86%	1886	4.40%	12762	29.79%
08	43345	-454	-1.04%	2491	5.75%	34424	79.42%	4186	9.66%	916	2.11%	7593	17.52%
09	41938	-1861	-4.25%	2325	5.54%	32391	77.24%	4415	10.53%	1496	3.57%	8236	19.64%
10	44934	1135	2.59%	2730	6.08%	32526	72.39%	5889	13.11%	2241	4.99%	10860	24.17%

District	18+_Pop	Deviation	% Deviation	H18+_Pop	% H18+_Pop	NH18+_Wht	% NH18+_Wht	NH18+_Bl	% NH18+_Bl	NH18+_Asn	% NH18+_Asn	HBAVAP	HBAVAP%
01	31085	-2139	-4.88%	2449	7.88%	13288	42.75%	12393	39.87%	1960	6.31%	16802	54.05%
02	33038	1480	3.38%	2401	7.27%	15026	45.48%	10612	32.12%	3943	11.93%	16956	51.32%
03	35159	2091	4.77%	1489	4.24%	25337	72.06%	5194	14.77%	2288	6.51%	8971	25.52%
04	30924	-1909	-4.36%	1737	5.62%	17040	55.10%	6714	21.71%	4592	14.85%	13043	42.18%
05	33185	1385	3.16%	1326	4.00%	25342	76.37%	4044	12.19%	1818	5.48%	7188	21.66%
06	34197	1242	2.84%	2202	6.44%	25080	73.34%	4879	14.27%	1108	3.24%	8189	23.95%
07	32349	-966	-2.21%	2054	6.35%	22245	68.77%	5524	17.08%	1540	4.76%	9118	28.19%
08	34211	-454	-1.04%	1672	4.89%	27965	81.74%	3097	9.05%	741	2.17%	5510	16.11%
09	32822	-1861	-4.25%	1590	4.84%	26023	79.29%	3312	10.09%	1188	3.62%	6090	18.55%
10	35775	1135	2.59%	1845	5.16%	26842	75.03%	4443	12.42%	1800	5.03%	8088	22.61%

District	Total17	Deviation	% Deviation	Hisp17	% Hisp17	White17	% White17	Black17	% Black17	Asian17	% Asian17	HBA17	HBA17%
01	42672	-2139	-4.88%	4609	10.80%	16183	37.92%	16180	37.92%	3310	7.76%	24099	56.47%
02	45428	1480	3.38%	4267	9.39%	17986	39.59%	14730	32.42%	5820	12.81%	24817	54.63%
03	46721	2091	4.77%	3026	6.48%	31200	66.78%	7146	15.30%	3471	7.43%	13643	29.20%
04	43496	-1909	-4.36%	4098	9.42%	22043	50.68%	9681	22.26%	5138	11.81%	18917	43.49%
05	46650	1385	3.16%	2317	4.97%	34186	73.28%	5712	12.24%	2623	5.62%	10652	22.83%
06	46854	1242	2.84%	4129	8.81%	32390	69.13%	6840	14.60%	1434	3.06%	12403	26.47%
07	45082	-966	-2.21%	4098	9.09%	29596	65.65%	7083	15.71%	2107	4.67%	13288	29.48%
08	43206	-454	-1.04%	2344	5.43%	32854	76.04%	4735	10.96%	1263	2.92%	8342	19.31%
09	43243	-1861	-4.25%	2439	5.64%	31879	73.72%	4842	11.20%	1755	4.06%	9036	20.90%
10	46705	1135	2.59%	3928	8.41%	32753	70.13%	6038	12.93%	2134	4.57%	12100	25.91%

District	CVAP17	Deviation	% Deviation	HCVAP17	% HCVAP17	WCVAP17	% WCVAP17	BCVAP17	% BCVAP17	ACVAP17	% ACVAP17	HBACVAP17	% HBACVAP17	HBAWCVP17	% HBAWCVP17
01	31584	-2139	-4.88%	2676	8.47%	13262	41.99%	12239	38.75%	2314	7.33%	17205	54.47%	17600	55.72%
02	31674	1480	3.38%	2277	7.19%	14200	44.83%	10877	34.34%	3311	10.45%	16444	51.92%	16708	52.75%
03	34699	2091	4.77%	1659	4.78%	24721	71.24%	5265	15.17%	2144	6.18%	9090	26.20%	9262	26.69%
04	31558	-1909	-4.36%	2415	7.65%	17392	55.11%	7180	22.75%	3366	10.67%	12962	41.07%	13154	41.68%
05	34289	1385	3.16%	1535	4.48%	25332	73.88%	4512	13.16%	1909	5.57%	7961	23.22%	8134	23.72%
06	34205	1242	2.84%	2492	7.29%	25142	73.50%	4617	13.50%	943	2.76%	8045	23.52%	8315	24.31%
07	33820	-966	-2.21%	2368	7.00%	23496	69.47%	5199	15.37%	1326	3.92%	8885	26.27%	9342	27.62%
08	33514	-454	-1.04%	1327	3.96%	26719	79.72%	3742	11.17%	834	2.49%	5900	17.60%	6106	18.22%
09	33448	-1861	-4.25%	1436	4.29%	25831	77.23%	3702	11.07%	1231	3.68%	6402	19.14%	6501	19.44%
10	35709	1135	2.59%	2038	5.71%	26510	74.24%	4795	13.43%	1422	3.98%	8257	23.12%	8371	23.44%

Note: Variables with 17 suffix denote 2013-2017 5-Year ACS; HBAWCVP17 includes Hispanic, Black, and Asian CVAP plus Black and White CVAP mixed persons

Source: Maptitude for Redistricting District Statistics window using U.S. Census Bureau 2010 Census Data and 2013-2017 5-Year ACS Data

User:

Plan Name: **VAB Illustrative Plan Final 10 Alt v3**

Plan Type:

Contiguity Report

Monday, August 19, 2019

11:30 AM

District	Number of Distinct Areas
1	1
2	1
3	1
4	1
5	1
6	1
7	1
8	1
9	1
10	1

User:

Plan Name: VAB Illustrative Plan Final 10 Alt v3

Plan Type:

Measures of Compactness Report

Monday, August 19, 2019

11:31 AM

Sum	N/A	0.00	N/A	N/A
Min	0.12	N/A	0.12	0.41
Max	0.59	N/A	0.52	0.90
Mean	0.35	N/A	0.33	0.71
Std. Dev.	0.16	N/A	0.15	0.18

District	Reock	Perimeter	Polsby-Popper	MinConvexPoly
1	0.14		0.14	0.49
2	0.12		0.12	0.41
3	0.33		0.35	0.75
4	0.29		0.34	0.71
5	0.51		0.52	0.88
6	0.59		0.45	0.90
7	0.29		0.21	0.58
8	0.56		0.49	0.86
9	0.30		0.24	0.60
10	0.38		0.48	0.88

User:

Plan Name: **VAB Illustrative Plan Final 10 Alt v3**

Plan Type:

Political Subdivison Splits Between Districts

Monday, August 19, 2019

11:32 AM

Total number of subdivisions:

County	0
Voting District	73

Number of subdivisions split into more than one district:

County	1
Voting District	21

Number of splits involving no population:

County	0
Voting District	0

Split Counts

County

Cases where an area is split among 10 Districts: 1

Voting District

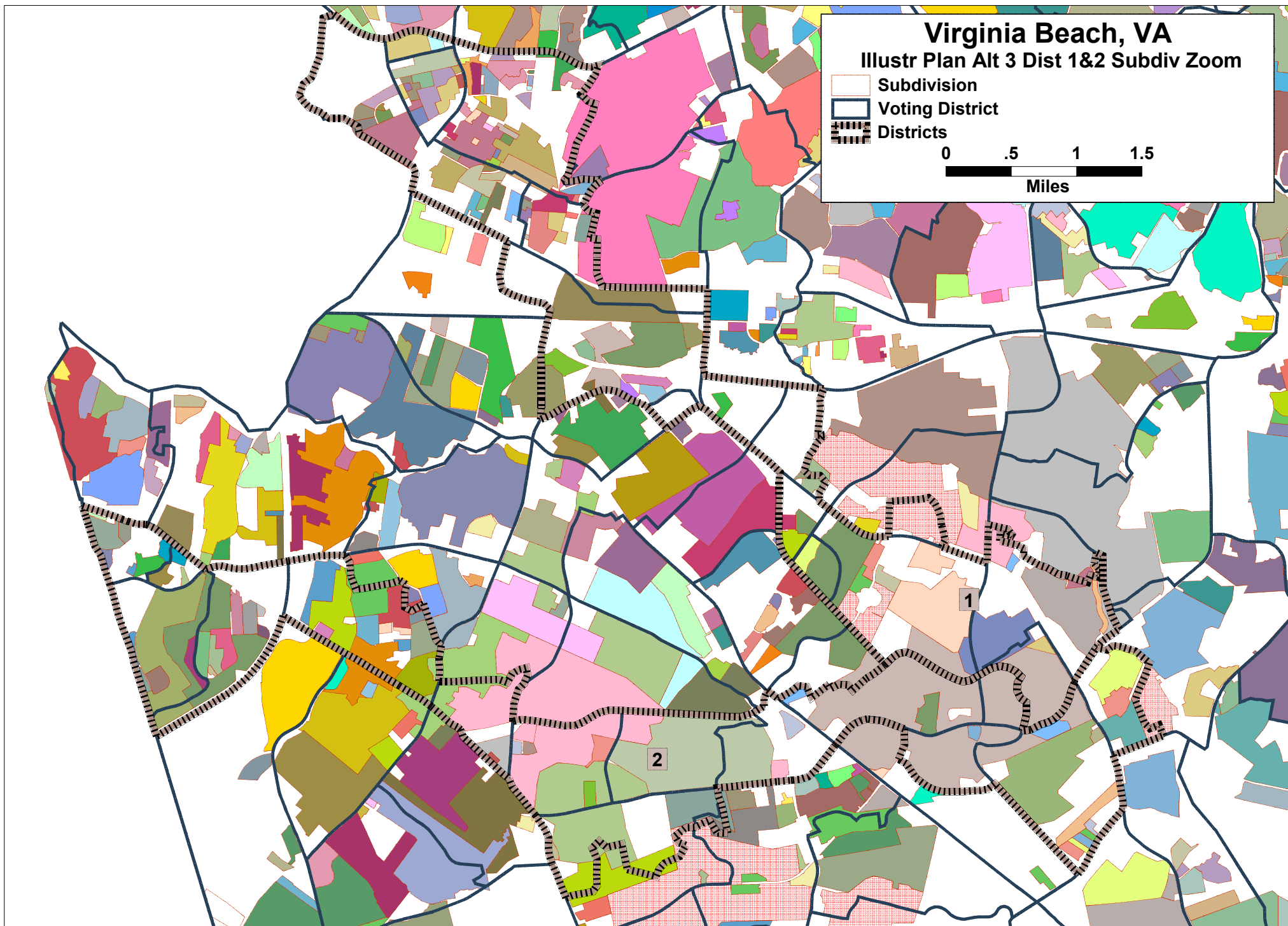
Cases where an area is split among 2 Districts: 21

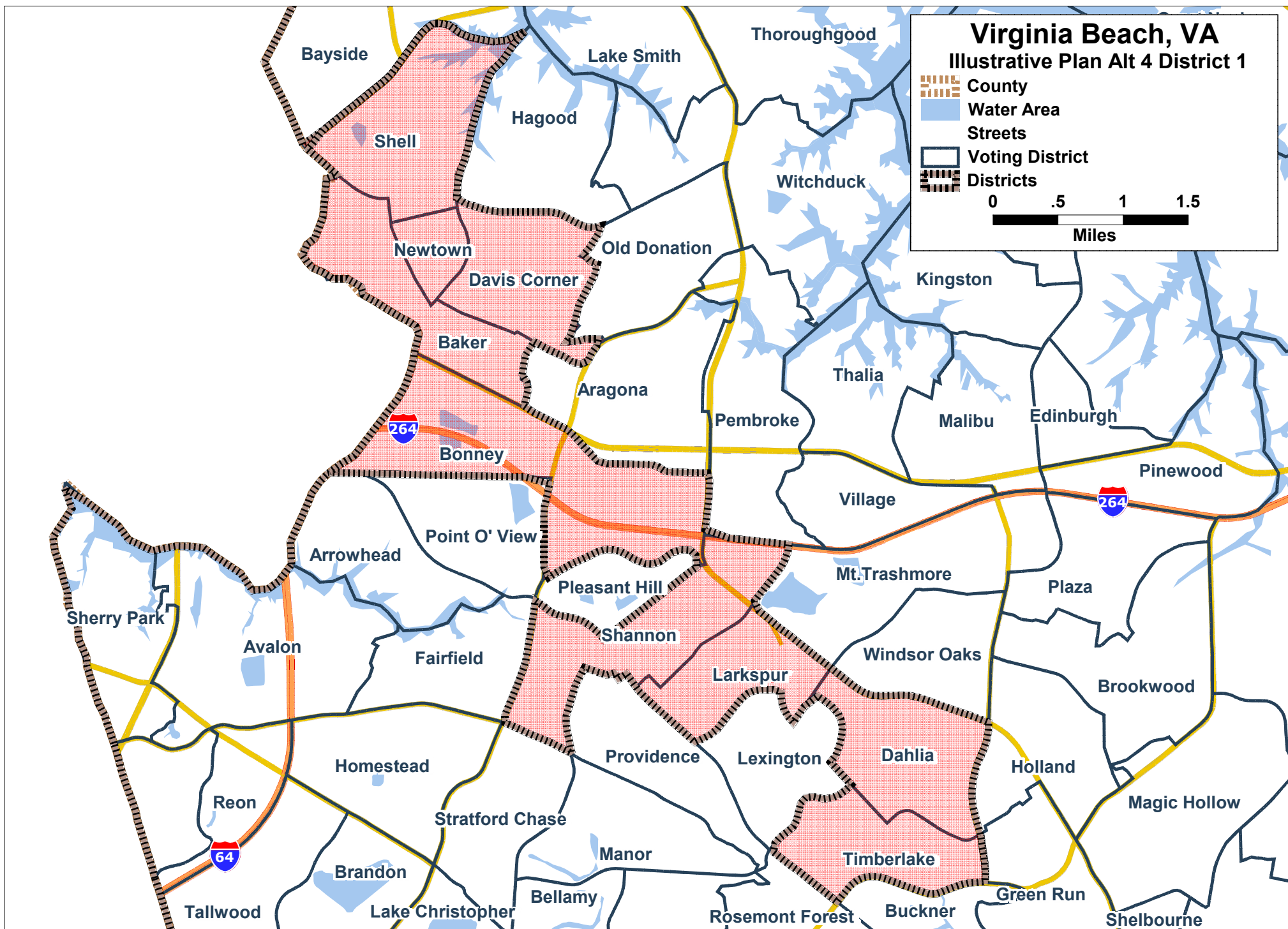
County	Voting District	District	Population
<i>Split Counties:</i>			
Virginia Beach City VA		1	41,660
Virginia Beach City VA		2	45,279
Virginia Beach City VA		3	45,890
Virginia Beach City VA		4	41,890
Virginia Beach City VA		5	45,184
Virginia Beach City VA		6	45,041
Virginia Beach City VA		7	42,833
Virginia Beach City VA		8	43,345
Virginia Beach City VA		9	41,938
Virginia Beach City VA		10	44,934
<i>Split VTDs:</i>			
Virginia Beach City VA	Aragona	1	2,298
Virginia Beach City VA	Aragona	9	4,982
Virginia Beach City VA	Avalon	2	583
Virginia Beach City VA	Avalon	3	4,004
Virginia Beach City VA	Bonney	1	2,756
Virginia Beach City VA	Bonney	3	686
Virginia Beach City VA	Buckner	2	3,272
Virginia Beach City VA	Buckner	4	1,473
Virginia Beach City VA	Green Run	1	1,810
Virginia Beach City VA	Green Run	2	5,972
Virginia Beach City VA	Holland	1	5,734
Virginia Beach City VA	Holland	7	2,086
Virginia Beach City VA	Homestead	2	2,939

Political Subdivision Splits Between Districts

VAB Illustrative Plan Final 10

County	Voting District	District	Population
Virginia Beach City VA	Homestead	3	2,788
Virginia Beach City VA	Larkspur	1	1,503
Virginia Beach City VA	Larkspur	3	1,729
Virginia Beach City VA	Lexington	1	913
Virginia Beach City VA	Lexington	3	4,344
Virginia Beach City VA	Magic Hollow	2	3,396
Virginia Beach City VA	Magic Hollow	7	3,913
Virginia Beach City VA	Mt.Trashmore	1	121
Virginia Beach City VA	Mt.Trashmore	7	5,945
Virginia Beach City VA	Pleasant Hill	1	36
Virginia Beach City VA	Pleasant Hill	3	4,338
Virginia Beach City VA	Rosemont Forest	2	1,944
Virginia Beach City VA	Rosemont Forest	4	3,779
Virginia Beach City VA	Round Hill	2	3,859
Virginia Beach City VA	Round Hill	4	3,349
Virginia Beach City VA	Shannon	1	451
Virginia Beach City VA	Shannon	3	2,877
Virginia Beach City VA	Shell	1	1,103
Virginia Beach City VA	Shell	10	3,413
Virginia Beach City VA	Sherry Park	2	585
Virginia Beach City VA	Sherry Park	3	1,914
Virginia Beach City VA	Stratford Chase	2	1,711
Virginia Beach City VA	Stratford Chase	3	2,268
Virginia Beach City VA	Timberlake	2	4,585
Virginia Beach City VA	Timberlake	3	1,949
Virginia Beach City VA	Upton	5	3,627
Virginia Beach City VA	Upton	6	1,469
Virginia Beach City VA	Windsor Oaks	1	1,197
Virginia Beach City VA	Windsor Oaks	7	5,310





Virginia Beach, VA

Illustrative Alternative 4 Plan - District 1 Statistics

District	Population	Deviation	% Deviation	Hispanic Orig	Hispanic Orig	NH_Wht	% NH_Wht	NH_Bl	% NH_Bl	NH_Asn	% NH_Asn	HBATTL	HBATTL%
01	44790	991	2.26%	3465	7.74%	19740	44.07%	16850	37.62%	2796	6.24%	23111	51.60%

District	18+ Pop	Deviation	% Deviation	H18+ Pop	% H18+ Pop	NH18+ Wht	% NH18+ Wht	NH18+ Bl	% NH18+ Bl	NH18+ Asn	% NH18+ Asn	HBAVAP	HBAVAP%
01	33494	991	2.26%	2236	6.68%	16315	48.71%	11723	35.00%	2240	6.69%	16199	48.36%

District	Total17	Deviation	% Deviation	Hisp17	% Hisp17	White17	% White17	Black17	% Black17	Asian17	% Asian17	HBA17	HBA17%
01	46033	991	2.26%	5191	11.28%	19183	41.67%	15251	33.13%	4152	9.02%	24594	53.43%

District	CVAP17	Deviation	% Deviation	HCVAP17	% HCVAP17	WCVP17	% WCVP17	BCVP17	% BCVP17	ACVP17	% ACVP17	HBACVP17	% HBACVP17	HBAWCVP17	% HBAWCVP17
01	33523	991	2.26%	2759	8.23%	15538	46.35%	11328	33.79%	2859	8.53%	16956	50.58%	17252	51.46%

Note: Variables with 17 suffix denote 2013-2017 5-Year ACS; HBAWCVP17 includes Hispanic, Black, and Asian CVAP plus Black and White CVAP mixed persons

Source: Maptitude for Redistricting District Statistics window using U.S. Census Bureau 2010 Census Data and 2013-2017 5-Year ACS Data

User:

Plan Name: **VAB Illustrative Plan Final 10 Alt v4**

Plan Type:

Contiguity Report

Monday, August 19, 2019

12:48 PM

District	Number of Distinct Areas
1	1

User:

Plan Name: **VAB Illustrative Plan Final 10 Alt v4**

Plan Type:

Measures of Compactness Report

Monday, August 19, 2019

12:51 PM

Sum	N/A	0.00	N/A	N/A
Min	0.19	N/A	0.11	0.47
Max	0.19	N/A	0.11	0.47
Mean	0.19	N/A	0.11	0.47
Std. Dev.		N/A		

District	Reock	Perimeter	Polsby-Popper	MinConvexPoly
1	0.19		0.11	0.47

User:

Plan Name: **VAB Illustrative Plan Final 10 Alt v4**

Plan Type:

Political Subdivison Splits Between Districts

Monday, August 19, 2019

12:52 PM

Total number of subdivisions:

County 0

Voting District 94

Number of subdivisions split into more than one district:

County 1

Voting District 0

Number of splits involving no population:

County 0

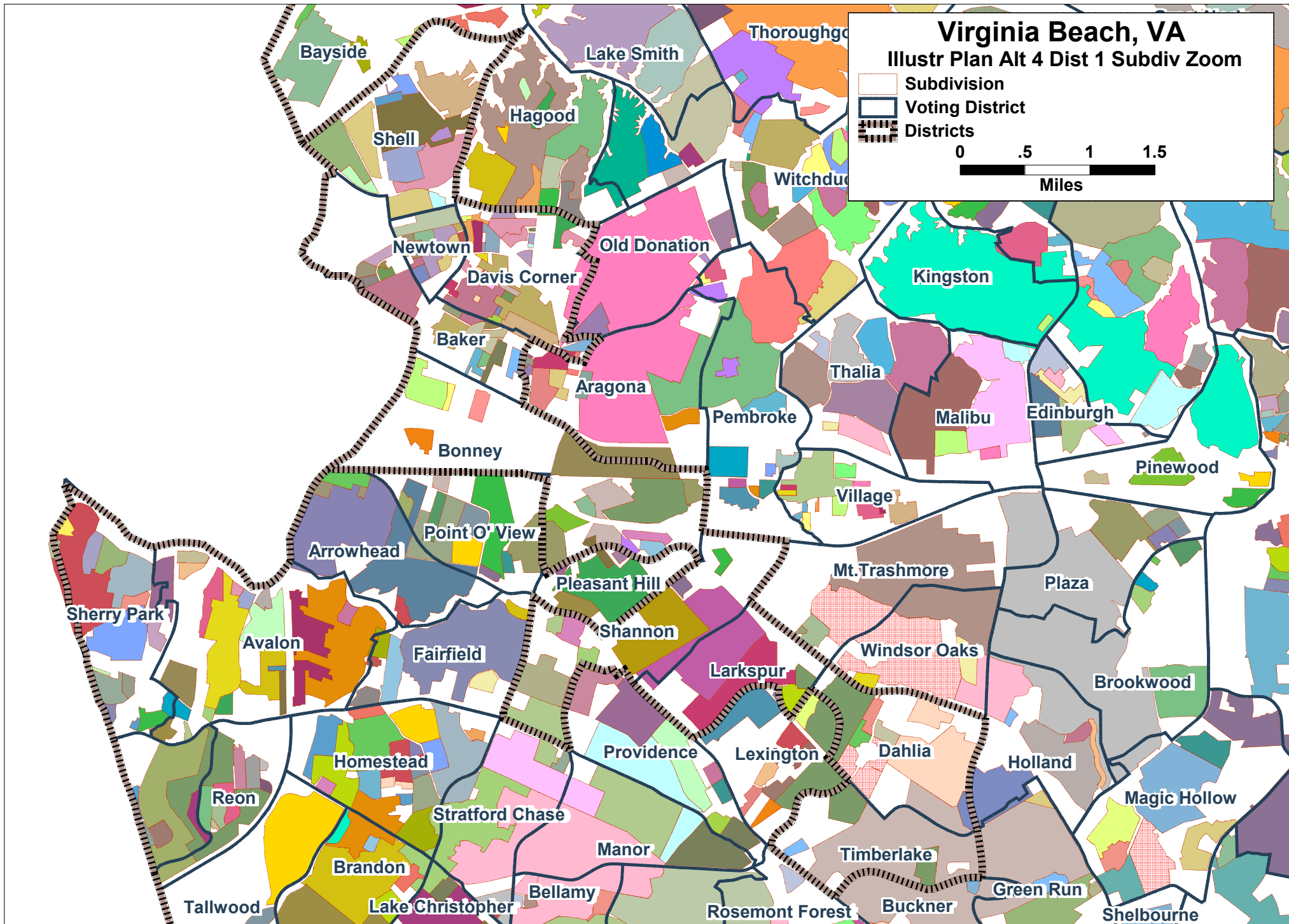
Voting District 0

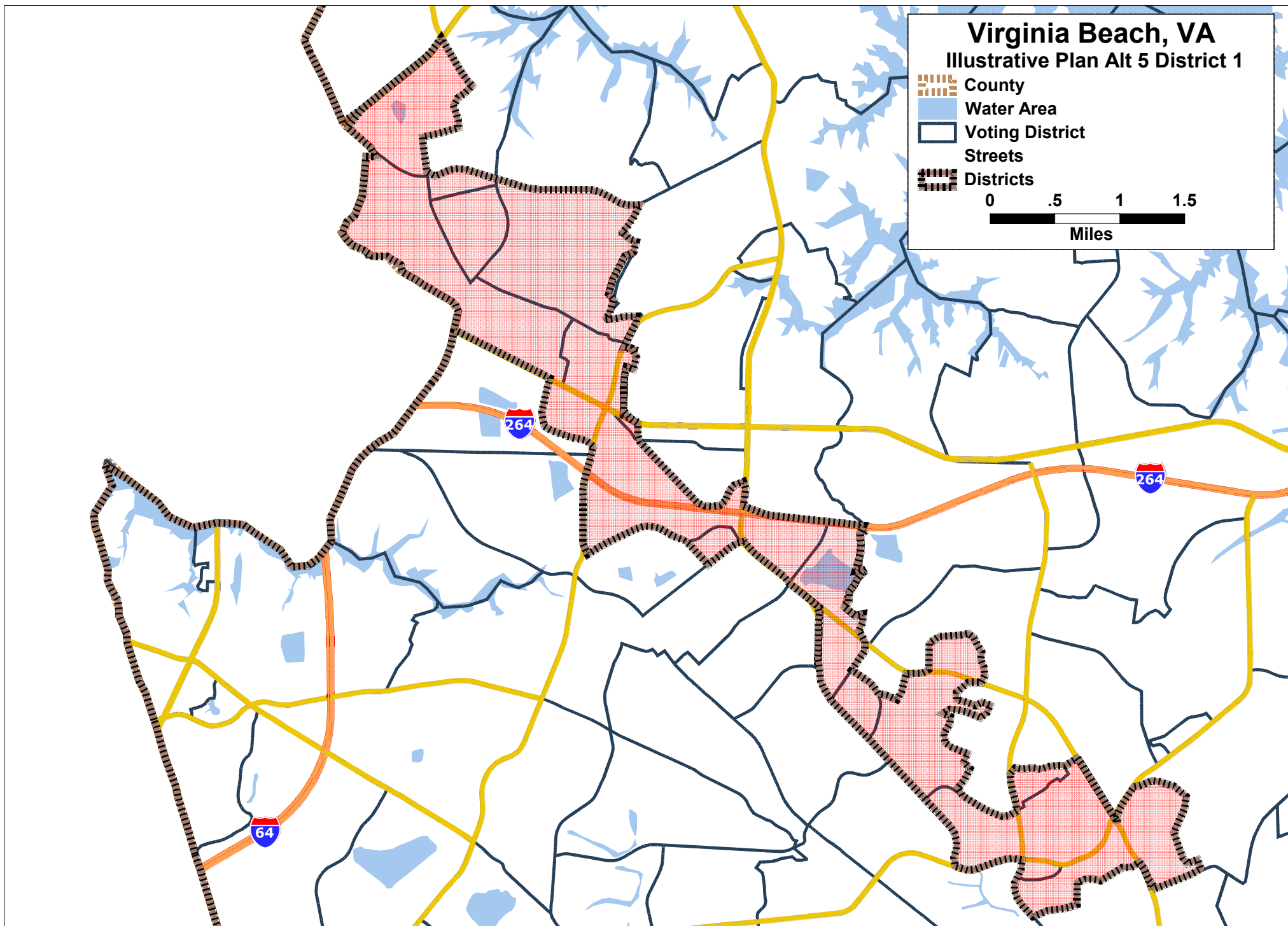
Split Counts

County

Cases where an area is split among 2 Districts: 1

County	Voting District	District	Population
<i>Split Counties:</i>			
Virginia Beach City VA		1	44,790





Virginia Beach, VA

Illustrative Alternative 5 Plan - District 1 Statistics

District	Population	Deviation	% Deviation	Hispanic Origin	% Hispanic Origin	NH_Wht	% NH_Wht	NH_Bl	% NH_Bl	NH_Asn	% NH_Asn	HBTTL	HBTTL%	HBATTL	HBATTL%
01	41832	-1967	-4.49%	3774	9.02%	14973	35.79%	18565	44.38%	2633	6.29%	22339	53.40%	24972	59.70%

District	18+_Pop	Deviation	% Deviation	H18+_Pop	% H18+_Pop	NH18+_Wh	% NH18+_Wh	NH18+_Bl	% NH18+_Bl	NH18+_Asn	% NH18+_Asn	HBVAP	HBVAP%	HBAVAP	HBAVAP%
01	30747	-1967	-4.49%	2455	7.98%	12395	40.31%	12851	41.80%	2077	6.76%	15306	49.78%	17383	56.54%

District	Total17	Deviation	% Deviation	Hisp17	% Hisp17	White17	% White17	Black17	% Black17	Asian17	% Asian17	HB17	HB17%	HBA17	HBA17%
01	43187	-1967	-4.49%	5033	11.65%	14312	33.14%	17953	41.57%	3510	8.13%	22986	53.22%	26496	61.35%

District	CVAP17	Deviation	% Deviation	HCVAP17	% HCVAP17	WCVAP17	% WCVAP17	BCVAP17	% BCVAP17	ACVAP17	% ACVAP17	HBCVAP17	% HBCVAP17	HBBWCVP17	% HBBWCVP17
01	30597	-1967	-4.49%	2657	8.68%	11984	39.17%	12960	42.36%	2090	6.83%	15617	51.04%	15962	52.17%

District	CVAP17	Deviation	% Deviation	HBACVP17	% HBACVP17	HBAWCVP17	% HBAWCVP17
01	30597	-1967	-4.49%	17669	57.75%	18018	58.89%

Note: Variables with 17 suffix denote 2013-2017 5-Year ACS; HBAWCVP17 includes Hispanic, Black, and Asian CVAP plus Black and White CVAP combined race persons; HBCVAP Includes Hispanic and Black Alone and is calculated by summing Hispanic and Black fields. HBBWCVP17 includes Hispanic and Black CVAP plus Black and White CVAP combined persons

Source: Maptitude for Redistricting District Statistics window using U.S. Census Bureau 2010 Census Data and 2013-2017 5-Year ACS Data

User:

Plan Name: **VAB Illustrative Plan Final 10 Alt v5**

Plan Type:

Contiguity Report

Monday, August 19, 2019

2:35 PM

District	Number of Distinct Areas
1	1

User:

Plan Name: **VAB Illustrative Plan Final 10 Alt v5**

Plan Type:

Measures of Compactness Report

Monday, August 19, 2019

3:16 PM

Sum	N/A	0.00	N/A	N/A
Min	0.11	N/A	0.09	0.42
Max	0.11	N/A	0.09	0.42
Mean	0.11	N/A	0.09	0.42
Std. Dev.		N/A		

District	Reock	Perimeter	Polsby-Popper	MinConvexPoly
1	0.11		0.09	0.42

User:

Plan Name: **VAB Illustrative Plan Final 10 Alt v5**

Plan Type:

Political Subdivison Splits Between Districts

Monday, August 19, 2019

3:19 PM

Total number of subdivisions:

County	0
Voting District	78

Number of subdivisions split into more than one district:

County	1
Voting District	16

Number of splits involving no population:

County	0
Voting District	0

Split Counts

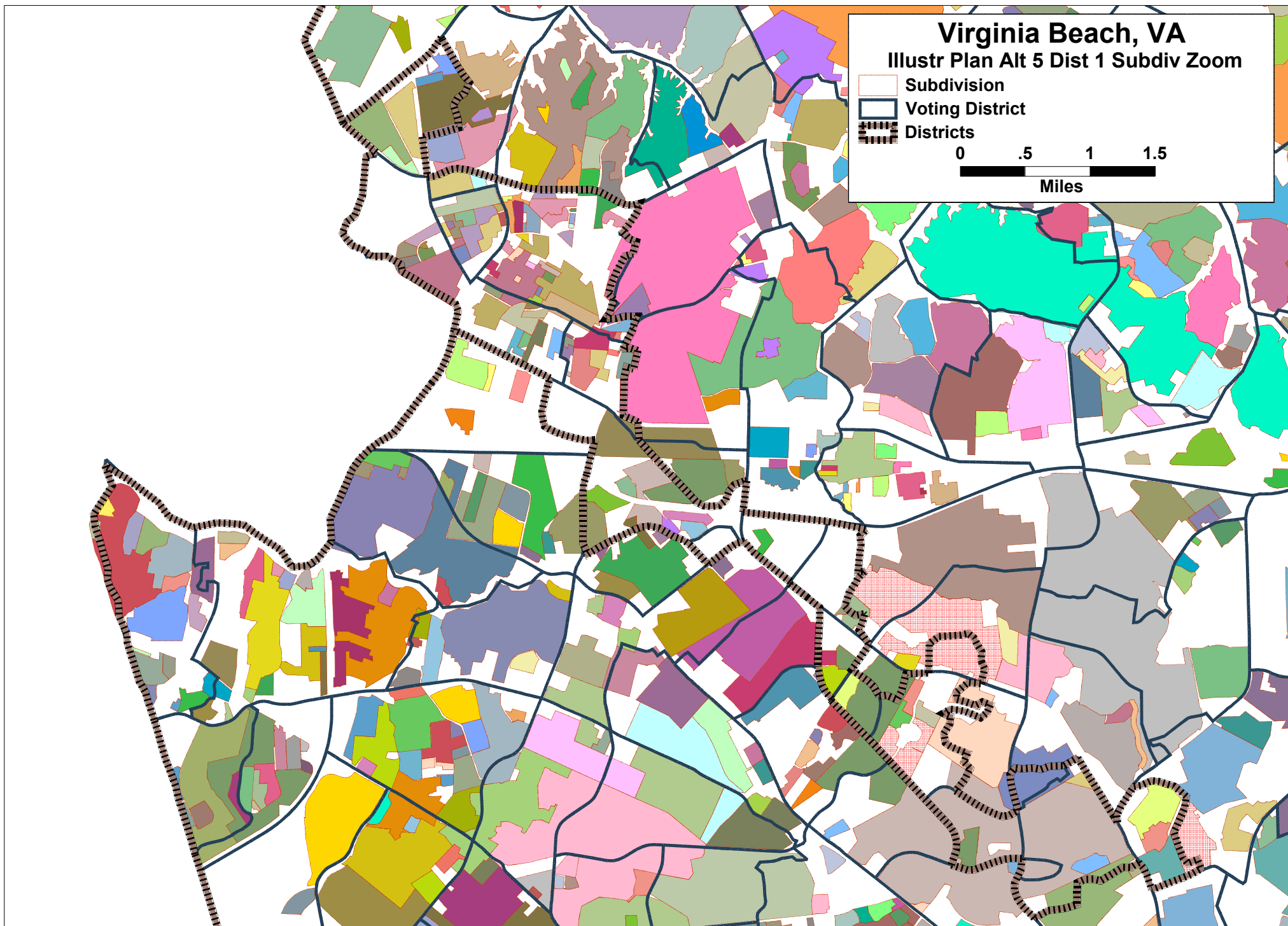
County

Cases where an area is split among 2 Districts: 1

Voting District

Cases where an area is split among 2 Districts: 16

County	Voting District	District	Population
<i>Split Counties:</i>			
Virginia Beach City VA		1	41,832
<i>Split VTDs:</i>			
Virginia Beach City VA	Aragona	1	2,028
Virginia Beach City VA	Bonney	1	1,581
Virginia Beach City VA	Buckner	1	228
Virginia Beach City VA	Dahlia	1	3,124
Virginia Beach City VA	Davis Corner	1	5,991
Virginia Beach City VA	Green Run	1	5,372
Virginia Beach City VA	Holland	1	906
Virginia Beach City VA	Larkspur	1	1,503
Virginia Beach City VA	Lexington	1	913
Virginia Beach City VA	Magic Hollow	1	3,396
Virginia Beach City VA	Mt.Trashmore	1	121
Virginia Beach City VA	Pleasant Hill	1	36
Virginia Beach City VA	Shannon	1	451
Virginia Beach City VA	Shell	1	3,018
Virginia Beach City VA	Timberlake	1	2,067
Virginia Beach City VA	Windsor Oaks	1	1,197



Appendix B

Disaggregation Analysis

Alternative Plans 1 through 5

Illustrative Plan Disaggregation Analysis

Dist	CVAP17 DisAg	CVAP17 Strp	CVAP DisAg	CVAP17 Chg	CVAP17
01	29766.09305	29641	29761	-5.09305	29761
02	32803.88821	32642	32804	0.11179	32804
03	31961.85648	31819	31960	-1.85648	31960
04	33799.93322	33623	33802	2.06678	33802
05	34688.84486	34407	34689	0.15514	34689
06	34443.57816	34140	34447	3.42184	34447
07	35686.66521	35367	35686	-0.66521	35686
08	33657.33407	33485	33660	2.66593	33660
09	32840.24399	32637	32843	2.75601	32843
10	34851.55528	34651	34848	-3.55528	34848

Dist	HBAC17 DisAg	HBAC17 Strp	HBA DisAg	HBAC17 Chg	HBA CVAP17	HBA CVAP17% Mapt	HBA CVAP17% Mapt wo/LPB
01	14892.63910	14770	14888	-4.63910	14888	50.03%	50.03%
02	16414.14826	16235	16415	0.85174	16415	50.04%	50.04%
03	13364.47424	13218	13365	0.52576	13365	41.82%	41.81%
04	10612.27770	10435	10612	-0.27770	10612	31.39%	31.40%
05	7131.76589	6861	7133	1.23411	7133	20.56%	20.56%
06	7428.54973	7128	7430	1.45027	7430	21.57%	21.57%
07	5228.71792	4928	5228	-0.71792	5228	14.65%	14.65%
08	9655.04044	9476	9658	2.95956	9658	28.69%	28.69%
09	8862.08495	8665	8863	0.91505	8863	26.99%	26.99%
10	7561.30030	7364	7559	-2.30030	7559	21.69%	21.70%

Illustrative Plan Alternative 1 Disaggregation Analysis

Dist	CVAP17 DisAg	CVAP17 Strp	CVAP DisAg	CVAP17 Chg	CVAP17
01	28294.91925	28180	28295	5.08075	28300
02	32619.56148	32457	32620	14.43852	32634
03	31767.84965	31622	31768	2.15035	31770
04	34596.28074	34413	34596	-12.28074	34584
05	34593.46698	34307	34593	-13.46698	34580
06	33748.02261	33455	33748	7.97739	33756
07	35686.66521	35367	35687	-0.66521	35686
08	34767.36566	34591	34767	7.63434	34775
09	33669.07549	33462	33669	6.92451	33676
10	34756.78546	34558	34757	-17.78546	34739

Dist	HBAC17 DisAg	HBAC17 Strp	HBA DisAg	HBAC17 Chg	HBA CVAP17	HBA CVAP17% Mapt	HBA CVAP17% Mapt wo/LPB
01	14568.96817	14454	14575	6.03183	14575	51.50%	51.49%
02	16834.47508	16656	16851	16.52492	16851	51.64%	51.61%
03	13176.52580	13027	13179	2.47420	13179	41.48%	41.48%
04	10709.12832	10526	10696	-13.12832	10696	30.93%	30.95%
05	6521.19601	6246	6511	-10.19601	6511	18.83%	18.85%
06	7456.68305	7166	7460	3.31695	7460	22.10%	22.10%
07	5228.71792	4928	5228	-0.71792	5228	14.65%	14.65%
08	9756.58947	9574	9765	8.41053	9765	28.08%	28.06%
09	8992.32990	8791	8998	5.67010	8998	26.72%	26.71%
10	7906.38480	7712	7888	-18.38480	7888	22.71%	22.75%

Source: U.S. Census Bureau 2013-2017 5-Year ACS; Maptitude for Redistricting Disaggregated CVAP data and Disaggregation data wo/Largest Populated Block technique

Illustrative Plan Alternative 2 Disaggregation Analysis

Dist	CVAP17 DisAg	CVAP17 Strp	CVAP DisAg	CVAP17 Chg	CVAP17
01	28224.99984	28106	28225	0.00016	28225
02	32395.00059	32237	32395	-0.00059	32395
03	32612.66803	32467	32613	3.33197	32616
04	33852.65126	33678	33853	-3.65126	33849
05	36147.09303	35845	36147	-10.09303	36137
06	33162.58693	32872	33163	10.41307	33173
07	35686.66521	35367	35687	-0.66521	35686
08	34767.36566	34591	34767	7.63434	34775
09	33669.07549	33462	33669	6.92451	33676
10	33981.88649	33787	33982	-13.88649	33968

Dist	HBAC17 DisAg	HBAC17 Strp	HBA DisAg	HBAC17 Chg	HBA CVAP17	HBA CVAP17% Mapt	HBA CVAP17% Mapt wo/LPB
01	14404.99995	14286	14405	0.00005	14405	51.04%	51.04%
02	16545.00019	16370	16545	-0.00019	16545	51.07%	51.07%
03	13591.51763	13441	13595	3.48237	13595	41.68%	41.68%
04	10614.56649	10439	10611	-3.56649	10611	31.35%	31.36%
05	7023.63545	6733	7016	-7.63545	7016	19.42%	19.43%
06	7338.28033	7052	7346	7.71967	7346	22.14%	22.13%
07	5228.71792	4928	5228	-0.71792	5228	14.65%	14.65%
08	9756.58947	9574	9765	8.41053	9765	28.08%	28.06%
09	8992.32990	8791	8998	5.67010	8998	26.72%	26.71%
10	7655.36119	7466	7642	-13.36119	7642	22.50%	22.53%

Source: U.S. Census Bureau 2013-2017 5-Year ACS; Maptitude for Redistricting Disaggregated CVAP data and Disaggregation data wo/Largest Populated Block technique

Illustrative Plan Alternative 3 Disaggregation Analysis

Dist	CVAP17 DisAg	CVAP17 Strp	CVAP DisAg	CVAP17 Chg	CVAP17
01	31587.28131	31469	31587	-3.28131	31584
02	31665.70626	31527	31666	8.29374	31674
03	34705.61224	34489	34706	-6.61224	34699
04	31558.23867	31421	31558	-0.23867	31558
05	34292.10237	34094	34292	-3.10237	34289
06	34203.94757	33973	34204	1.05243	34205
07	33811.75044	33634	33812	8.24956	33820
08	33502.68562	33198	33503	11.31438	33514
09	33462.97047	33198	33463	-14.97047	33448
10	35709.69757	35409	35710	-0.69757	35709

Dist	HBAC17 DisAg	HBAC17 Strp	HBA DisAg	HBAC17 Chg	HBA CVAP17	HBA CVAP17% Mapt	HBA CVAP17% Mapt wo/LPB
01	17197.04206	17067	17205	7.95794	17205	54.47%	54.44%
02	16435.31021	16294	16444	8.68979	16444	51.92%	51.90%
03	9093.91607	8882	9090	-3.91607	9090	26.20%	26.20%
04	12963.08539	12823	12962	-1.08539	12962	41.07%	41.08%
05	7964.64672	7768	7961	-3.64672	7961	23.22%	23.23%
06	8045.21025	7835	8045	-0.21025	8045	23.52%	23.52%
07	8879.99670	8686	8885	5.00330	8885	26.27%	26.26%
08	5887.58880	5595	5900	12.41120	5900	17.60%	17.57%
09	6427.16387	6167	6402	-25.16387	6402	19.14%	19.21%
10	8257.03843	7963	8257	-0.03843	8257	23.12%	23.12%

Source: U.S. Census Bureau 2013-2017 5-Year ACS; Maptitude for Redistricting Disaggregated CVAP data and Disaggregation data wo/Largest Populated Block technique

Illustrative Plan Alternative 4 Disaggregation Analysis

Dist	CVAP17 DisAg	CVAP17 Strp	CVAP DisAg	CVAP17 Chg	CVAP17
01	33533.20337	33370	33533	-10.20337	33523

Dist	HBAC17 DisAg	HBAC17 Strp	HBA DisAg	HBAC17 Chg	HBA CVAP17	HBA CVAP17% Mapt	HBA CVAP17% Mapt wo/LPB
01	16960.87827	16799	16956	-4.87827	16956	50.58%	50.58%

Source: U.S. Census Bureau 2013-2017 5-Year ACS; Maptitude for Redistricting Disaggregated CVAP data and Disaggregation data wo/Largest Populated Block technique

Illustrative Plan Alternative 5 Disaggregation Analysis

Dist	CVAP17 DisAg	CVAP17 Strp	CVAP DisAg	CVAP17 Chg	CVAP17
01	30594.34636	30490	30594	2.65364	30597

Dist	HBC17 DisAg	HBC17 Strp	HB DisAg	HBC17 Chg	HBA CVAP17	HBA CVAP17% Mapt	HBA CVAP17% Mapt wo/LPB
01	17657.89626	17535	17669	11.10374	17669	57.75%	57.72%

Dist	HBC17 DisAg	HBC17 Strp	HB DisAg	HBC17 Chg	HB CVAP17	HB CVAP17% Mapt	HB CVAP17% Mapt wo/LPB
01	15590.04023	15474	15617	26.95977	15617	51.04%	50.96%

Source: U.S. Census Bureau 2013-2017 5-Year ACS; Maptitude for Redistricting Disaggregated CVAP data and Disaggregation data wo/Largest Populated Block technique

Appendix C

Maptitude for Redistricting Partial Client List

Maptitude for Redistricting is used by a majority of the state legislatures, both political parties, county and regional governments, city and local governments, educational institutions, and many public interest groups and corporations.

Partial list:

National Government & Party Organizations

Democratic National Committee
 Department of Justice, Civil Rights Division
 National Committee for an Effective Congress
 National Republican Congressional Committee
 Republican National Committee

State Government & Organizations

Alabama Democratic Party
 Alabama House Majority
 Alaska Division of Elections
 Arizona Democratic Party
 Arizona House of Representatives
 Arizona Independent Electoral Commission
 Arizona Redistricting Commission
 Arizona Republican Party
 Arizona Senate Democrats
 California Assembly Rules Committee
 California Governor's Office
 California Legislative Data Center
 California Senate Office of Research
 California Senate Minority Reapportionment
 California State Assembly
 Colorado Department of State
 Colorado Governor's Office
 Colorado House of Representatives
 Colorado Reapportionment Commission
 Colorado Republican Party
 Delaware Commissioner of Elections
 Delaware Legislature
 District of Columbia Republican Party
 Georgia Democratic Party
 Georgia General Assembly
 Georgia Office of Planning and Budget
 Georgia Redistricting Services
 Georgia Republican Party
 Idaho Legislative Services
 Illinois House Republican Caucus
 Illinois Senate Republican Caucus
 Kansas Legislative Research Department
 Kentucky Legislative Research Commission
 Kentucky Republican Party
 Louisiana Democratic Party
 Louisiana House of Representatives
 Louisiana Senate
 Maine Democratic Party
 Maine Judicial Center
 Maine Legislature
 Maryland Department of Legislative Services
 Maryland General Assembly
 Maryland Governor's Census 2000
 Maryland Office of Planning
 Maryland Republican Party
 Massachusetts House of Representatives
 Massachusetts Senate
 Massachusetts Senate Clerk's Office
 Massachusetts Speakers Office
 Michigan Democratic Party
 Minnesota DFL
 Minnesota Governor's Office
 Minnesota Land Management Information Center

Minnesota Legislative Coordinating Commission
 Minnesota Office of Planning
 Minnesota Republican Party
 Minnesota Secretary of State
 Minnesota Senate
 Minnesota Supreme Court
 Mississippi Chambers of Hon. E. Gray Jolly
 Mississippi Community Policy Research
 Mississippi Joint Reapportionment Committee
 Mississippi Republican Party
 Missouri Democratic Party
 Missouri House of Representatives
 Missouri Office of Administration
 Missouri Office of Management, Budget, and Planning
 Missouri Republican Party
 Missouri Senate
 Nevada Republican Assembly Caucus
 Nevada Republican Party
 New Hampshire GCIS
 New Jersey Office of Legislative Services
 New Mexico Republican Party
 New York Empire State Development
 New York Leg. Task Force on Demographic Research & Reapportionment
 New York State Assembly Democratic Majority
 New York State Assembly Republican Caucus
 New York State Democratic Senate Campaign Committee
 New York State Governor's Office
 New York State Office of Technology
 New York State Republican Assembly Campaign Committee
 New York State Senate Majority
 New York State Senate Minority
 North Carolina Democratic Party
 North Carolina General Assembly
 North Carolina Republican Party
 North Dakota Legislative Council
 Ohio Republican Party
 Ohio Secretary of State
 Oklahoma Governor's Office
 Oklahoma Senate
 Pennsylvania House Democrats
 Pennsylvania Senate Democrats
 Puerto Rico Supreme Court
 South Carolina Budget and Control Board
 South Carolina House of Representatives
 South Carolina House Republican Caucus
 South Carolina Senate
 South Carolina Senate Republican Caucus
 Tennessee Attorney General
 Tennessee General Assembly
 Tennessee Office of Legal Services
 Texas Comptroller of Public Accounts
 Texas General Land Office
 Texas Legislative Council
 Utah Republican Party
 Vermont Legislative Council
 Virginia Democratic Caucus
 West Virginia Democratic Legislative Council
 West Virginia Legislature
 Wyoming Democratic Party
 Wyoming Legislature
 Wyoming Republican Party

County Government & Regional Planning Organizations

Acadiana LA Regional Development District
 Alabama Association of County Commissioners
 Alameda County CA, Community Development

Alamosa County CO, County Clerk
 Anne Arundel County MD
 Anoka County MN
 Assateague Island MD National Seashore
 Barton County KS
 Becker County MN
 Benton County MN
 Blount County AL, County Commission
 Boone County WV Commission
 Brooke County WV, County Commission
 Butte County CA
 Calvert County MD
 Capitol Region LA Planning Commission
 Cerro Gordo County IA
 Chambers County AL Commission
 Chambers County AL, Board of Education
 Chaffee County CO
 Champaign County IL, County Clerk
 Chisago County MN
 Clark County NB Manager's Office
 Clay County WV, County Commission
 Cobb County GA Elections
 Comal County TX
 Contra Costa CA, Water District
 Coweta County GA
 Cumberland County ME
 Elbert County CO
 Forsyth County GA
 Glenn County CA, Elections Department
 Grand County CO
 Hardee County FL
 Hardin County KY, County Clerk
 Hardy County WV Clerk
 Harris County TX, Tax Office
 Harris County TX, Republican Party
 Hennepin County MN
 Hennepin County MN Elections
 Hood County TX
 Inyo County CA, Planning Department
 Jackson County MN
 Kanawha County WV, Clerk/Elections
 Kent County DE
 Kent County MI
 Kent County MN
 Jackson County MO, Election Board
 Jefferson County CO, County Clerk and Recorder
 Jefferson County WV Clerk
 Johnson County KS, Election Office
 Kisatchie-Delta LA Regional Planning and Development
 Lewis County WV Clerk
 Liberty County GA Board of Commissioners
 Lincoln County MT
 Logan County CO Clerk and Recorder
 Los Angeles CA Superior Court
 Louisiana Acadiana Regional Development District
 Louisiana Central Regional Planning District
 Louisiana Kisatchie-Delta Planning and Development
 Louisiana North Delta Regional Development
 Louisiana Rapides Area Planning Commission
 Louisiana South Central Planning and Development
 Lyon County MN
 Madison County AL Board of Education
 Madison County AL Commission
 Marion County WV
 Marshall County WV, County Clerk

McCracken County KY
 Miami-Dade County FL, Board of County Commissions
 Mobile County AL, Engineer's Office
 Monongalia County WV, Clerk's Office
 Nassau County NY
 Navajo Nation AZ
 Nevada County CA
 New Castle County DE
 North Delta LA RPDD
 Nowata County OK, Clerk
 Pasco County FL, Supervisor of Elections
 Pierce County WA, Elections
 Pipestone County WV
 Pocahontas County WV Commission
 Polk County FL, Supervisor of Elections
 Putnam County FL, Supervisor of Elections
 Putnam County WV, County Clerk
 Ramsey County MN
 Roane County WV 911
 Rapides Area Planning Commission
 Saint Louis County MN
 Saint Lucie County FL, Community Development
 Saint Lucie County FL, Supervisor of Elections
 San Benito County CA
 San Diego Community College District
 San Diego County Data Processing
 Sanford/Lee County NC, County Commission
 Santa Barbara County CA
 Santa Cruz County CA, ISD Department
 South Central LA Planning
 Stillwater County MT GIS
 Summit County NJ Board of Elections
 Summit County OH, Republican Party
 Sumter County FL, Supervisor of Elections
 Tate County MS
 Three Rivers MN Park District
 Tippecanoe County IN, Republican Party
 Trinity County CA
 Trinity County TX
 Valley Transportation Authority (CA)
 Vigo County IN
 Walton County FL Board of Commissioners
 Westchester County NY
 Westchester County NY Republicans
 Wicomico County MD
 Wood County WV

City Governments

Albany NY, Common Council
 Baltimore MD, City Council
 Baltimore MD, Mayor's Office
 Bloomington MN
 Buffalo NY, City Clerk
 Cambridge MD Commissioners
 Champlain MN
 Columbia MO
 Dallas, TX
 Denver CO, Election Commission
 Douglasville GA
 Haverford PA
 Jefferson MO
 Lake Charles LA
 Los Angeles CA Council
 Maple Grove MN
 Minneapolis MN Metropolitan Council

New York NY City Council
New York NY Redistricting Commission
Pasadena CA
Pensacola FL, Planning and Neighborhood Development
Phoenix AZ
Pocomoke MD
Pueblo y Salud CA
Richfield MN
Robbinsdale MN
Saint Louis Park MN
San Francisco CA, Department of Elections
San Leandro CA
Shorewood MN
Temple TX
Villages FL
Westport CT

Educational Institutions

Alabama State University Center for Leadership and Public Policy
Benedict College
Claremont McKenna College Rose Institute
Cronkite School of Journalism
CUNY Graduate Center
CUNY, Medgar Evers College
George Mason University
Georgia Institute of Technology
Georgia State University
Jefferson State Community College
MARIS MS
Mississippi State University/Stennis Institute
Norfolk State University
Queens College
Paul Quinn College Urban Institute
Princeton University Woodrow Wilson School
Rice University
San Diego Community College
Southern Illinois University
University of Alabama, Dept. of Geography
University of California, Berkeley, Statewide Database
University of California, Los Angeles, Department of Urban Planning
University of Florida
University of Georgia Redistricting Services
University of New Orleans
University of Pennsylvania Law School
University of Texas, Pan American

Interest Groups and Corporations

Aboussie & Associates
Advance Policy Institute
American Civil Liberties Union
American Public Dialogue
Analytica Research Corp.
Applied Research Coordinates
Arizona State AFL-CIO
Asian American Legal Defense Fund
Asian Law Alliance
Asian Pacific American Legal Center
Assateague Island National Seashore
Barney L. Knight and Associates
Baselice & Associates
Beacon Blue, LLC
Benedict College
BonData
Boyer & Associates
Brock, Clay, Calhoun, Wilson, and Rogers
Capitol Campaign Strategies

CAUSE

CBC Policy and Leadership Institute
 Cedric Floyd
 Centre d'Entreprises d'Idelux (Luxembourg)
 Citizens for Fair Redistricting
 Colorado Hispanic Bar Association
 Community Cartography
 Conservative Opportunities
 Coordinating and Development Corporation
 Databasics
 Datatrends
 DCI Group
 DelBello Donellan Weingarth Tartallia
 Dellums, Barauer, Halterman, and Assoc.
 Delta Consulting Association
 Democratic Project
 DFS Associates
 Electoral Geodemographics
 EPIC/MRA
 ERF and Associates
 Fields Communications
 Food Research & Action Center
 Friends of Dennis Cardoza
 Frontier International Electoral Consulting
 Gathings, Kennedy and Associates
 Geopolitical Solutions
 Gilliard Blanning & Associates
 Gilmore and Monahan
 Girl Scouts of San Jacinto Council
 Guinn and Morrison
 Harris, Shelton
 Heffley & Associates
 Hispanic Leadership Institute
 Holland and Rigby
 Hong Kong Geomatics Consultants
 Infinity Group
 Integrated Demographic Profiles
 James Blacksher
 Jewish Community Relations Council
 Joe Shumate and Associates
 John Stennis Institute at Mississippi State University
 Jones, Cork, and Miller LLP
 KVUE-TV
 Lapkoff & Gobalet Demographic Research
 Law Offices of Darryl Piggee
 Law Offices of James C. Belt
 Law Offices of Rolando Rios
 Law Offices of Samuel L. Walters
 Lawyers' Committee for Civil Rights Under Law
 Legislative Demographic Services
 Levine McEvoy
 Louisiana Coordinating and Development Corporation
 Matrix
 MALDEF
 Map Applications
 McNally Temple Associates
 Metro Consulting
 Metropolitan Area Research
 Metro-Rent, Inc.
 Mexican-American Legal Defense Fund (MALDEF)
 NAACP Legal Defense Fund
 National Demographics
 Navajo Nation
 Nielson Media Research
 Nielson, Merksamer

Oxford Systematics
Pactech Data and Research
Panacea Consulting
PBS&J
PDQ GeoDemographics
Phillips McFall
Polidata
Precision Cartographics
Reapportionment Group 2000
Redistricting LLC
Research Advisory Services
Romero Molina
Sacks Tierney
Shephard and Staats
Smith and Mahoney, PC
Smith, Ellis, & Stuckey
South Carolina Fair Share
Southern Policy Law Center
Southern Regional Council
Teaching That Works
Texans Against Gerrymandering
Texans for Fair Redistricting
Texas Trial Lawyers Association
Tharrington Smith, LLP
USHLI
Voter Solutions
W. Hayward Burns Environmental E.C.
Whitman Soule
William C. Velasquez Institute
Xerox Corporation

Maptitude Online Redistricting Clients

Arizona Redistricting Commission
City of Los Angeles
Fairfax VA
Idaho Legislature
New York City Districting Commission
Orange County CA